VOL. I. NO. 6 PRICE, 15 CENTS AUGUST 15, 1911

THE COMMERCIAL CAR JOURNAL

UNIVERSAL TRUCKS

EVENTUALLY the truck that wise purchasers will buy will be the one built by an organization whose *sole aim* is to build a *commercial* vehicle—one whose *entire effort* in design, construction, selling and "after service" is spent in giving the owner a *money saving vehicle;* not a remodeled pleasure car or a machine whose up-keep expense increases in a geometrical ratio.

It is admitted that all commercial motor vehicles, like all automobiles, need adjustment, but the amount, character and ease of such adjustment determines its cost and hence the relative value of the truck.

The question of cost of maintenance and ease of adjustment is more important than the first price of the truck.

The Universal Motor Truck Company was organized for the express purpose of manufacturing, selling and suitably maintaining economical and efficient commercial vehicles.

They have given the question of maintenance and adjustment very careful consideration.

The following enumeration of some of the distinctive points in Universal design will readily convince the purchaser or dealer of the pertinence of this statement:

Pleasure car practice has been entirely forgotten.

Universal trucks designed for trucking only.

Three unit idea of design makes for great accessibility and ease of adjustment.

Small loss of time necessary for this work.

Overhead type of design makes motor very accessible—can be reached from front and sides of body, also through floor boards, and at the same time allows use of short wheel base, short overhang on rear axle.

This means even distribution of load.

Low frame allows ample room for general inspection of all mechanism underneath body at any time.

Three point suspension of motor unit and jack shaft, differential clutch unit allows perfect flexibility under severest conditions.

Radiator is mounted on springs in protected position just back of motor, and is cooled by direct current of air thrown from the Sirocco fan contained in the fly-wheel.

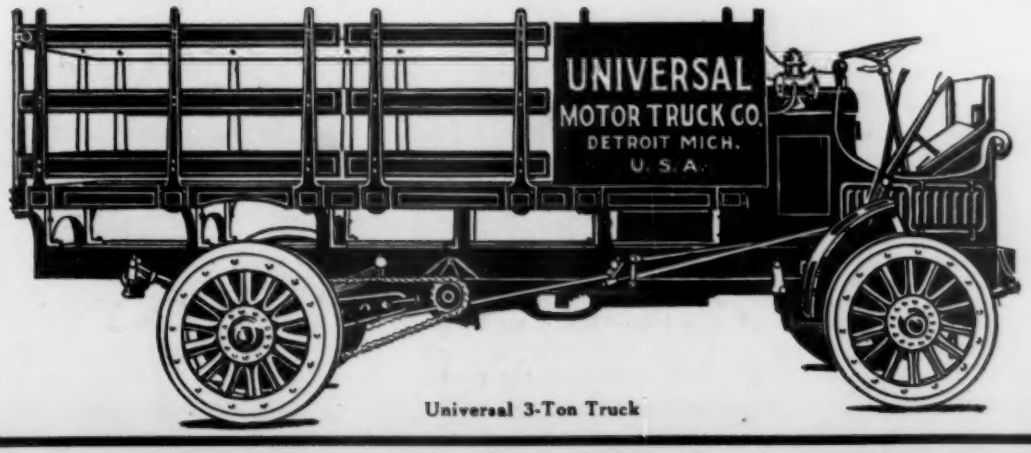
The long stroke motor, developing great power and slow speeds.

Ball governor on motor, non-accessible to driver, limits speed 12 miles per hour.

The entire mechanism is of extra heavy design to stand hard usage.

"Built on the three unit plan"

Universal Motor Truck Company, 507 Theodore St., Detroit, Mich.



Universal 3-Ton Truck

PUBLISHED THE 15TH OF EACH MONTH

CHILTON COMPANY

MARKET & 49TH STS. PHILADELPHIA

HIGH SPEED

NON-GRAN

BEARING BRONZE

"The High Price Bronze that Saves Repairs"

The Bearings of your Trucks are small parts, but they are probably the most vital in determining the Truck's efficiency and its ability to give you constant service.

THE BALDWIN LOCOMOTIVE WORKS in replacing the wornout bearings in their entire fleet of Swiss "Saurer" Motor Trucks used NON-GRAN *exclusively.* They have to foot the up-keep bills on these Trucks and, more important still, they have to keep the Trucks on the road day and night every day of the year. They chose NON-GRAN in spite of the fact that its first cost is about twice that of any other bearing bronze made.

¶ NON-GRAN High Speed Bearing Bronze differs radically from any other bronze made. Because of its dense structure and extraordinary cohesive toughness, NON-GRAN will not—it cannot—granulate. No amount of frictional stress can separate its component parts. That is why Bearings of NON-GRAN retain their original surface polish throughout their entire life. NON-GRAN will resist and withstand impact and pressures that would put any other bearing bronze out of commission, and will not weaken or depreciate under any condition of service.

¶ The open, loose-knit structure of ordinary bearing bronzes is responsible for countless automobile troubles and for heavy repair and renewal expenses. Flaking off is a characteristic weakness of most commercial bronzes. This in itself should be enough to prohibit their use on motor cars. Any bronze that flakes or granulates soon saturates the lubricating oil with minute metallic particles, causing undue wear, not only to the part itself, but to all other parts of the motor reached by the metallized oil. One need not be a mechanical engineer to appreciate the harmful effect this oil is having on every working part of the motor.

¶ If you are a Motor Truck Manufacturer or a Motor Truck User, we shall be very glad to hear from you and give you particulars in full about NON-GRAN High Speed Bearing Bronze which is now being so largely and so successfully used.

¶ NON-GRAN is built for ultimate economy,—*not* to meet a selling price. Write us now asking for full particulars.

AMERICAN BRONZE COMPANY

BERWYN, PA., U. S. A.

THE PUBLISHERS' PERSONAL PAGE

By C. A. MUSSELMAN

Experience Counts

You can learn some valuable lessons from the experiences of those who have used commercial cars for years—who were pioneers in the introduction of power-driven vehicles.

The Brewers

were undoubtedly among those most prominent in introducing commercial cars. In this issue we have endeavored to show what is being done with commercial cars, by brewers in all parts of the country. In a leading article by our Managing Editor, Mr. E. S. Foljambe, the subject of the use of electrical trucks by the brewers of New York and Philadelphia is covered. In this article it is shown that electrics are used in larger numbers by brewers than gasoline machines, and the reasons for this predominance of electrics are clearly stated. One cannot but recognize, after reading this article, that any large installation of commercial cars in brewery service is a more economical method of delivery than by horses.

In an able article by Mr. William Johnson, entitled, "Successful Commercial Car Operation as Reflected in Brewery Service," he has shown where and how, not only electrics but gasoline commercial cars are rendering efficient service to the brewers. In this article, brewery delivery in St. Louis, Chicago, Detroit and Milwaukee is taken up. In a short sketch by Mr. Charles Smyth, the attitude of the brewers in Denver is given.

Cost of Brewery Delivery in Europe

Not only have we covered in this issue the use of commercial cars by brewers in this country, but in the Foreign Department will be found a most interesting treatise by our Foreign Correspondent, entitled, "The Commercial Car and the Brewery Trades in Europe." This article is unusually interesting, as it contains some authentic figures on the cost of operation of commercial cars in brewery service in Europe, giving a means of comparison of the cost of doing the same work in America.

What is Depreciation?

The question of what should be charged yearly as depreciation on commercial cars, is one that is very important to every truck user or prospective purchaser. In the articles on trucks in use by brewers it is clearly shown that 20 and 25% are not correct assumptions, as many vehicles have been in continuous operation for eight and ten years. Our Foreign Correspondent also gives his views on the subject of depreciation, and we shall be glad to hear the opinions of our readers on this subject; giving space to communications in our next issue. What do you think about it?

"OPPORTUNITY"

"Taken at the flood leads on to fortune—neglected—," etc., etc. You are neglecting an opportunity which may be of untold value to you if you have not yet subscribed to the COMMERCIAL CAR JOURNAL.

As an owner of commercial cars, what is the paltry sum of $1 per year, when by this means you can keep informed as to the very latest and most up-to-date methods of caring for power-driven vehicles?

As a prospective user, can you afford to purchase a car or several cars,—an investment perhaps of many thousand dollars,—without a thorough knowledge of what is on the market?

IF YOU FAIL

to grasp this opportunity at the flood, it may be too late. The COMMERCIAL CAR JOURNAL is now being offered at the ridiculously low price of $1. The information contained therein is high grade and comes directly from the users. It is of value to you as a prospective purchaser, as an owner, or as an operator of commercial cars.

YOU MAY BE SAVED

much embarrassment, annoying delays, and money spent in correcting errors, by a simple investment of $1 for the COMMERCIAL CAR JOURNAL.

Now is the time to avail yourself of this opportunity. Begin at the beginning; start when your competitor does; keep abreast of the times. You cannot do this for less than 10c. a month, and that is the offer we are now making you on the COMMERCIAL CAR JOURNAL. If you have not subscribed, send in your money at once by money order, check, stamps, etc., at our risk, and join the satisfied readers of the

COMMERCIAL CAR JOURNAL,
Market and 49th Sts., Phila., Pa.

Regulation of Drivers

Mr. Johnson has taken up the subject of Regulation of Drivers, in an interesting article under the heading, "How About the Man at the Wheel?" some very helpful suggestions being given.

Foreign Trucks

In the department, "From Across the Water," Mr. Frank Palmer has also given us a very terse and technical description of a leading truck, —The Leyland.

In the World of the Electric

The electric vehicle is receiving daily more recognition. In this issue the Walker Balance-Gear Trucks are described.

Mr. Harvey Robinson, Secretary of the Electric Vehicle Association of New York, gives in this department, under the heading, "New York—a Field for the Commercial Car," an instructive *résumé* with some figures as to the electric trucks in use by the various companies in New York.

Truck Descriptions

In this issue two very different types of gasoline commercial cars are described, one being the well-known product of the Grabowsky Power Wagon Co., of Detroit, and the other the new Mais truck of the Mais Motor Truck Co., of Indianapolis. This vehicle has many novel features, including a spur and internal gear drive.

There are several shorter articles of interest, among which may be mentioned, "An Example of Long Hauls."

Regular Departments

In the regular departments, there will be found under "Design and Construction" an article entitled "Unit Construction," in which Mr. Foljambe points out the very great desirability of using quickly-replaceable units in commercial cars, and makes some suggestions as to the methods of mounting and retaining such units.

Valuable matter will also be found in the departments "Among the Manufacturers," "News of the Dealers and Garages," and "Instructive Experiences."

The Autocar

"Used in every line of Business"

THE profitable use of Autocars has been demonstrated by merchants who use them in every line of business. The manufacturer or merchant who does not look into the merits of the Autocar Motor Vehicle carefully is losing an opportunity for considerable economy.

Continuous Efficiency Guaranteed

Write for Commercial Car Catalog No. 4-C
Pleasure Car Catalog No. 5-C

THE AUTOCAR COMPANY
Factory: ARDMORE, PENNSYLVANIA
MANUFACTURERS OF COMMERCIAL AND PLEASURE MOTOR VEHICLES
(Established 1897)

PHILADELPHIA
23rd and Market Sts.

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Beacon St. and Commonwealth Ave.

The Commercial Car Journal

VOLUME 1 PHILADELPHIA, AUGUST 15, 1911 NUMBER 6

The National Efficiency and Economy Competition Postponed to Later Date

WHEN we announced the "National Efficiency and Economy Competition" and fixed August 15th as the date upon which it was to start, we did not realize the size of the proposition or the tremendous amount of work it would involve. We received entries from all over the United States—in fact the response of those who realize the advantages to be derived from this competition is most surprising and gratifying; but, in spite of our constant and reiterated declarations of the conditions and purposes of the contest, hundreds of owners of motor wagons and trucks have not yet apparently been able to understand the requirements and purposes clearly. It must be plain to all that the greater the number of entries and the larger the scope, the more valuable will be the results of such competition. If a postponement will give us better opportunity to work out the details and more time to explain the why and how, to the great number who still "want to know," and thus treble or quadruple the number of entries we have already received, are we not wise to postpone it?

A number of the concerns who have entered cars in the National Efficiency and Economy Competition have also objected to the starting of the competition in August, stating that so many of the persons who should see to the proper starting of the records of the cars at the outset would be away on their vacations during the first few weeks that they would be compelled to withdraw, and others have stated that they would enter their vehicles if the starting of the competition was postponed to some date when the proper men would be on hand.

This postponement will also give many who were not ready to enter their cars to start in August, an opportunity to enter, and consequently will increase the number of competitors considerably. This also is very desirable, as before stated, as the value of the records depends largely on numbers. One or two cars of each make may make poor showings through some circumstances for which the car could not be held responsible, or if the conditions were particularly favorable, one car may make an exceptionally good showing for which the car should not receive entire credit. Whereas, if 10 or 12 cars of that make were entered the average result would be secured and peculiar circumstances would only enter into the result to a small degree.

This competition is of great importance to the truck industry as well as to motor commercial vehicle owners, and should therefore not be hurried, particularly when its purpose can be conserved just as well—in fact, better perhaps—later as well as now. For these reasons the "National Efficiency and Economy Competition" will be postponed until a later date to be announced in a future issue of the COMMERCIAL CAR JOURNAL.

Now is the Time to Enter Your Car

If you have not already done so fill out blanks for your cars and send them in as soon as possible. We have our record pads completed and any who have entered their cars, if they so desire may have these record pads for use before the competition begins. This will be a decided advantage as it will enable those who are in charge to get into the routine of keeping accurate accounts of the performance of their commercial cars and will also in all probability show where changes for bettering the service can be made, to say nothing of the advantages to be gained by having the drivers familiar with these requirements. This will make drivers more careful and they will very soon get into the habit of turning in each night an accurate statement of the events of the day. These records, if faithfully kept until the time of the Competition, will insure that the trucks are running in a systematic manner and will certainly be an advantage in the Competition itself to those who have entered at this time. Send in your entry blanks at once and receive the record pads; there is no charge whatever, either as an entry fee or for these record books.

N. A. A. M. SHOW IN NEW YORK

Already the body of the Motor Accessory Manufacturers and 133 manufacturers who are not members of the Automobile Board of Trade have announced that they will exhibit at the show in Grand Central Palace, conducted by the National Association of Automobile Manufacturers, January 10 to 17. Both pleasure and commercial cars will be exhibited, the two being separated. Commercial cars will be exhibited on the main and second floors.

This show will have the same management as the Chicago show. Diagrams and application blanks will be out in September.

FORM OF GUARANTEE RECOMMENDED

The special committee of the Motor Truck Club of New York, appointed for the purpose, has prepared a guarantee on commercial cars. It reads as follows:

"We guarantee to replace, free of charge, in the truck, if delivered to us, any parts which prove defective in workmanship or material within six months from date of shipment. If the truck is not sent to us we will ship such defective parts by freight, prepaid.

"All parts on which replacements are claimed must promptly be sent to us, carriage prepaid, for inspection.

"This guaranty does not cover tires, wear and tear, or accidents, and ceases upon the truck being overloaded, misused or neglected, or upon a body, not approved by us, being placed on the chassis."

This guarantee is recommended as being equally fair to both maker and purchaser.

MISREPRESENTATION

The following letter from the Motor Truck Club of New York furnishes an illustration of the misrepresentation against which all connected in any way with the industry should stand opposed. The letter is self-explanatory:

"It has come to the attention of the Motor Truck Club that an agency in this city (not a member of the club) is stating to prospective purchasers that tire manufacturers will guarantee a greater mileage on the wheels of their trucks than those of other vehicles. This statement is absolutely without fact, as the club has made a thorough investigation and finds that no tire representative in this city will guarantee a different time mileage on steel wheels than it will on wood wheels.

"The market is suffering to-day from such misrepresentation, and we feel that a safe and rational statement of the truth, showing what a truck can do rather than telling what it will do, is the safest plan for all of us to pursue."

DRIVERS BUYING CARS BY INSTALMENTS

Taxi drivers in London are buying their cars on the instalment plan. After a first payment of $1,000, monthly payments of $75 are made until the full price of $2,125 is paid.

COUNCILMAN DANIEL YONKINS, of Butler, Pa., made the statement in a recent report, that the adding of an automobile fire truck has led to a reduction on the insurance rates of Butler by 25 per cent.

CHICAGO MOTOR CLUB'S COMMERCIAL RUN

Rules and entry blanks for the Chicago Motor Club's commercial vehicle demonstration on September 18, 19 and 20 were issued recently by Chairman John H. Kelly. The contestants will be penalized for lateness at controls, replacing parts on vehicles, taking on oil, gasoline or electric charging at any points other than controls, for damaged or lost parts, bad breaks, etc., at the end of the demonstration.

The routes which have been laid out by Frank B. Wood and L. A. Watts are within a short radius of Chicago. The first day the commercial cars will follow confetti to Whiting, then to East Chicago, to Hammond, returning by the Wolf Lake road to Chicago. The second day the machines will go north to Evanston, returning to the Transit House at the stockyards for luncheon, it being the intention to park the cars for an hour in order that the packers may have an opportunity to inspect them. The afternoon run will be from the stockyards to Oak Park and return. The third day the run is to Pullman, Kensington, Harvey, Chicago Heights and return. Each day's run will average approximately 65 miles.

Twelve classes have been provided for, divided according to carrying capacity. Each class will have to run to a specified schedule, and each truck must carry its load recorded on the registration blank, which load must be supplied by the entrant in bags of sand unless otherwise specified. At the completion of the three-days' run there will be final outdoor operative tests of brakes, clutches and transmissions.

SOUTH BEND'S TAX

The city council of South Bend, Ind., has passed an ordinance taxing commercial cars as follows: Each two-passenger car used by livery men for public hire, $6; on each three and four-passenger car, $7; on each five or more passenger car, $8; on each delivery car, cart or cab, $5; on each commercial car, 2,500-lb. capacity or less, $6; on each large motor truck over 2,500-lb. capacity, $7; on each motor cart, cab, delivery wagon or truck equipped with metal tires, $1 additional to the above. It is expected the tax will bring in about $20,000 which amount is to be used in the repair and improvement of the streets.

What's the Use

BENEVOLENT OLD LADY.—My poor man, why do you sit there so dejectedly, it cannot be that you are still hungry?

TRAMP WITH THE EVIL EYE.—Hungry?—naw. Dere's worse tings dan bein' hungry. Thoist, it is, mum; thoist, —but what's de use of expectin' dat ting ter break down.

NEW YORK CAB AND TAXI COMPANY TO BE REORGANIZED.

The New York Cab and Taxi Company, which recently went into the hands of a receiver, has been sold to a reorganization committee for $218,501. It is stated that a new company with a capital of $1,700,000, divided into $200,000 first preferred, $250,000 second preferred and $1,250,000 common stock, will be formed. The issuing of $250,000 bonds is also contemplated.

The stock will be distributed as follows: To first mortgage bond holders, $183,000 first preferred stock; general merchandise creditors, $225,000 second preferred stock; second mortgage bondholders, $1,250,000 common stock at 50 cents on a dollar. Of those who do not accept the plan, general creditors will be paid 10 cents on a dollar in cash and second mortgage bondholders 34 cents on a dollar.

TRANSPORTING SHOWS BY MOTOR

In France, commercial cars are used with great success by traveling shows. One large traveling cinematograph theater makes exclusive use of motors, transporting two outfits with audience capacity for 500 and 1,000 people. This man formerly owned fourteen horses. He now uses seven trucks and two touring cars. The outfits are distributed as follows: The smaller theater is carried on four 15 h. p. commercial cars, and the larger on three 30 h. p. cars, while the two touring cars carry the musicians and are used also for billposting.

Of the four smaller cars, one is used as an entrance and ticket wagon. Another carries the cinematograph machine and films. The tents, seats and other baggage is carried by the two other cars.

With the larger show, one of the machines furnishes living accommodations for the principals, another for the two mechanics, both carrying also miscellaneous paraphernalia, while the third carries the tents, seats, etc.

The proprietor of this organization had long experience with horse equipment and is now most emphatically in favor of motors as being cheaper and quicker. His jumps average 25 to 30 miles.

A still more pretentious show which is using motor equipment is the Cemier traveling theater. This has a capacity of 2,000. The equipment is carried in duplicate, enabling quick jumps over comparatively long distances, and three road trains are required. Two of these carry each a complete equipment of tent, stage, scenery, etc., and while one is being used the other is sent ahead to the next stop. The third train carries the company and its necessary baggage.

Ten machines are used, and in erecting the tent, which weighs 3½ tons and is supported by five steel columns, the power of the motors is used through winches.

SPHINX MOTOR CO. ACQUIRES RIGHTS TO RENO-BOIS SLIDING-VALVE MOTOR

Announcement has just been made of the acquisition from Hart O. Berg, of Paris, France, of the patents for the Reno-Bois motor for the United States, Canada and Mexico. A number of men prominent in the business and financial world have just formed the Sphinx Motor Company, which announces that it is prepared to grant licenses to American and Canadian gasoline automobile builders for the use of this motor, which is a type of sliding valve engine.

The Sphinx Motor Company is incorporated under the laws of Delaware, its officials being C. Philip Coleman, formerly vice-president, secretary and treasurer of the Singer Sewing Machine Company, president; D. W. Yeckley, treasurer Bayonne Steel Castings Company, treasurer; Vernon Munroe, secretary. The directorate is composed of C. P. Coleman, W. D. Sargent, Wm. A. Redding, Harry W. Davis and Arthur H. Lockett. The general offices of the Sphinx Motor Company will be at Room 2006, 30 Church Street, New York City.

The Reno-Bois motor is constructed with a short split moving sleeve above the engine piston and not in contact with it. The sleeve surface of the Reno-Bois motor is so small that friction upon the cylinder walls is practically nil, giving the engine a very high mechanical efficiency. Seizing of the sleeves is practically impossible as the valve sleeve is split and free to expand and contract and for that reason makes practicable the distribution of oil over its entire surface. If the lubricating oil should become exhausted in the Reno-Bois engine no damage can be done to the parts since, if the friction attains a certain value, the cam simply forces the sleeve to its farthest limit, where it would remain, due to the inability of the spring to return it; this gives a warning to the driver as to the need of replenishing his oil supply.

Freight Hauling With the Commercial Car

Here is a good illustration of freight transportation by the commercial car versus the railroad. This machine averages 125 miles every day over country roads, carrying loads of freight weighing 2,200 pounds on each trip. It is a one-ton Rapid, owned by the Oakland Motor Car Company, of Pontiac, Mich., and hauls the company's freight and accessories between that city and Detroit. The distance is 30 miles each way and the car makes two round trips daily, covering an average of about 125 miles each day. Part of the way the roads are very rough and sandy, and there are many steep hills and long grades. The Oakland Company has found this plan not only saves a considerable amount in freight charges, but enables them to get their goods to the factory promptly and when they are most needed.

SALESMAN'S CAR

In recognizing the need of salesmen for specially equipped cars in calling on customers, the Brush Runabout Company is building a "Salesmen's Special." The carrying compartment of this car accommodates three sample cases of ordinary size. It is of such artistic appearance that when the top is lowered the car can be used for pleasure. The compartment has a locking device to insure the safety of goods carried. The price of the "Special" with full equipment is $585.

"PIONEER FREIGHTER" ARRIVES IN NEW YORK

The ocean-to-ocean trip of the five-ton Saurer commercial car which ended in New York the afternoon of August 2, had a more serious purpose than some of the endurance exhibitions that have been given. It cannot be doubted that the development of commercial cars for carrying heavy loads, and for lighter express service as well, has been retarded in this country—which is far behind Europe in this respect—by the feeling that American highways were so inferior to the continental roads that it would be impossible to use commercial cars economically here as has for some time been done abroad. It was with the intention of correcting this idea that the Saurer "Pioneer Freighter" assumed the difficult test of carrying across the United States a three-and-a-half ton load at a time of year when the conditions of travel are anything but the most favorable.

The Saurer "Pioneer Freighter"

The trip has been of no little general public service. The United States Government sent a special representative of the Office of Public Roads of the Department of Agriculture to study road conditions between Denver and Los Angeles—a section of the country where the highways are of great importance to transportation because of the necessarily large areas without direct railroad connection. A. L. Westgard was selected for this work; and being not only a topographer but a motor car expert too, he gathered a good deal of practical information as to the necessities of road construction for motor transportation service and as to the important features of motor car construction for meeting road difficulties.

It has been made evident, for one thing, by the ocean-to-ocean run that there is a field for the motor truck as successor to the horse-drawn stage for transportation of both passengers and goods, and that where railways and other common carriers cannot operate profitably in sparsely settled regions commercial cars may be the means of building up the territory. Although the "Pioneer Freighter" proved that it was possible for a motor truck to carry even a heavy freight load across country—part of the way the Saurer ran through the open prairie where there was no road at all—it is evident that in the present stage of road development, at any rate, the motor truck cannot do this work over long distances with as great dispatch and economy as can the common carriers. For short distance freight hauling, however, the matter lies all the other way, for a good motor truck can cover a moderate trip, including loading and unloading, in less time than it takes a shipper to get a freight car—to say nothing of the time it takes the freight car to move. And when there is railway congestion, particularly as during the crop moving period, this means a large saving of expense and often of loss of perishable goods.

It happened that the "Pioneer Freighter" was on its way during the army manoeuvres in Texas, and it was made very evident to observers that the commercial car would crowd out the traditional mule for military service as it is driving the horse from dray service in the city streets.

Even a far-traveled automobilist can have little idea of the difficulties encountered by a big commercial car, even though very powerful and, for its size, light, in traversing the variety of roads between the coasts. The load carried by the "Pioneer Freighter" consisted of camp equipment and timbers for shoring up bridges and making mud holes passable. The car also carried a powerful winch, operated by the regular motor, with which it hauled itself out of some of the bad spots. But with the tremendous raking and straining involved in such progress, the mechanism and the chassis structure came through unharmed except for the breaking of two leaves in a spring when the car struck an unseen road obstacle in the dark.

One of the interesting and remarkable details of the trip was the way in which the tires stood their work. The "Freighter" came into New York with the original set of tires throughout—Goodrich Wireless Motor Truck Tires, those on the rear wheels being dual. There was no tendency of the soft rubber portion of the tire to loosen and break away nor was there any shredding or grinding, though many miles of the route were over dry and boulder-covered creek bottoms, while in many places the Saurer was run for a mile or more on the sleepers of steam railways in lieu of a better road.

FISK SALESMEN USE BRUSH DELIVERY CAR

The largest individual purchase of Brush light delivery motors since the introduction of this type of body, was made recently by the Fisk Rubber Company, who ordered thirty of these cars shipped to the leading cities of the country. They will be used by salesmen to carry supplies and repairs.

Since the Brush light delivery car was placed on the market, the factories in Detroit have been worked to capacity to fill orders. This vehicle of six hundred pounds capacity is being adopted rapidly by merchants as the successor to the one-horse delivery system. Its future is unlimited. The vehicle of six hundred pounds capacity is more economical to maintain than one horse and is capable of covering much more ground.

THE STEWART & CLARK MANUFACTURING COMPANY, of Chicago, Ill., has opened two additional branch offices, one in Kansas City, Mo., at 1825 Grand Avenue, under the direction of Harry E. Weber, who has been traveling that territory for the Stewart & Clark Manufacturing Company for the past eighteen months. The other branch is at Indianapolis, 514 North Capitol Avenue, under the management of L. L. Banford, who has covered that territory for several years.

A CASE WHERE A COMMERCIAL CAR WOULD NOT PAY

The General Vehicle Company admits that in one case it could not see where a G. V. electric would save its prospective customer any money. The letter is given ad verbatim:

General Vehicle Company,
Long Island City.
Gentleman:

I am in Dying and Cleaning bissnis and I am thinking to increase my work to buy Horse and Wagon. before that. please advise me did you manufacturers small low price car. to answer for same. allso let me know price and term oblige

Yors trouly
Joseph S. Pooskifi.

ST. LOUIS COMMERCIAL CAR TAXES

The new ordinance in St. Louis, Mo., taxes commercial cars as follows: One-ton capacity, $10 per year; two-ton, $12.50; over two tons, $15. Commercial cars in express, furniture or baggage service are taxed $25. Horse-drawn wagons do not escape, however, but must pay as follows: One horse, $7.50; two-horse, $10; three-horse, $12.50; four-horse, $15.

THE WICHITA FALLS MOTOR COMPANY, of Wichita Falls, Tex., is constructing a factory to manufacture commercial cars, which will be in operation by Sept. 1st.

H. M. BURNELL, vice president of the Western Motor Car Company, of Chicago, Ill., expired suddenly in Chicago, on July 31. He was formerly identified with the Sternberg interests.

C. R. HOYME, well known in the automobile industry, is now Assistant Eastern District Supervisor for the Alden Sampson Manufacturing Company, a division of the United States Motor Company. He is in charge of sales of Sampson trucks.

A. F. MAIS, of the Mais Motor Truck Company, of Indianapolis, Ind., has been studying conditions in San Francisco. He is most enthusiastic over local prospects and believes the coming year will see the motor-driven truck more common on the streets of this city than the horse and wagon.

THE VEEDER MANUFACTURING COMPANY, of Hartford, Conn., is erecting a new factory building. The addition was made necessary by the company's rapidly growing business in odometers, etc. The new building will be 43 x 183 ft., of concrete, three stories.

WILLIAM L. DAY, assistant secretary of the Parlenand Orendorff Plow Company, Kansas City, left that concern June 1 to become general sales manager for the Mitchell-Lewis Motor Company, of Racine, Wis. Mr. Day has been connected with Kansas City implement houses for thirty-one years and has for twenty-seven years been with the firm he now leaves. The Mitchell-Lewis concern does a large business in motor trucks.

THE SWINEHART TIRE & RUBBER COMPANY claims it has just removed a 36 x 4 in. single truck tire of clincher flange type from a three-ton Kelly truck belonging to Jas. B. Clow Company, Chicago, after twenty thousand miles of service. Also a 36 x 5 in. tire of the same type from the Abresch-Cramer truck, belonging to the Brunswick-Balke-Collander Company, Chicago, after eighteen thousand miles of service.

ELECTRIC STREET WASHERS FOR SCHONEBERG-BERLIN

Schoneberg-Berlin is to install twelve electric street washers, and the plans of the city call for an all-motor equipment by next year, horses being abandoned.

THIRTY-THREE COMMERCIAL CARS TO ONE FIRM

That the New York Telephone Company realizes the importance of the motor-driven car is evidenced by the fact that it recently placed an order for thirty-three Mack trucks. The contract calls for machines of one, two and three-ton capacity, to meet the varied needs of the big telephone company. The order was received by H. A. Seller, local distributer of Mack commercial cars.

MUNICIPAL SERVICE CARS

The city engineering department of Indianapolis, Ind., has discarded horse-drawn vehicles and installed two fifteen hundred pound, one-cylinder gasoline trucks. These will be used by the surveying corps in taking the men from one part of the city to another. It is believed their use will save fully one-fourth of the time formerly used in getting about the various sections of the city.

SWINEHART INCREASES CAPITAL

The Swinehart Tire and Rubber Company, of Akron, O., has increased its capital from $400,000 to $800,000, the action being taken at the annual meeting of the stockholders. It is stated that manufacturing and branch facilities will be increased at once.

KANSAS CITY has jumped to the front rank of municipalities which recognize the value of commercial cars in the various departments of city service. The city is a hotbed of commercial car competition. In a recent case involving an order for six machines there were no less than seventeen bidders for the city's patronage.

Franklin Air-Cooled, Pneumatic-Tired, One-Ton Car; used by Perry E. Simmons, of Portland, Ore., mover and expressman. At latest advices this car had been run 10,240 miles with no form of tire trouble, not even a puncture, and the original tires are still in use. They are 36 x 5½ in., front and rear.

THE COMMERCIAL CAR JOURNAL

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NOT TOO FAST,—BE CONSERVATIVE

Within the last year there has been practically a stampede by pleasure car makers, into the commercial car field. These makers all seem to feel that the commercial car offers a tremendous future development and that they should share in the profits to be derived. All this may be true, but it is not by over hasty production that profits accrue. The manufacturer of a commercial car is one requiring most serious and painstaking thought, and designs should be developed by those spending considerable time studying the commercial car's special needs. An adapted pleasure car chassis, as has been before mentioned in these columns, is not at all suited to commercial car purposes.

In spite of these facts, so-called commercial cars are coming onto the market almost daily which are nothing more than reconstructed pleasure cars, put out in the hopes that the maker may share in the commercial car profit. Every such machine does untold damage and holds back true progress and should therefore be frowned upon by all real commercial car manufacturers. It is certainly unfortunate that so many of these near commercial cars have gotten into the hands of the user, as in nine out of ten cases these users have an unusual amount of trouble, which is always laid to commercial cars in general, and are very apt to become discouraged or disgusted with commercial cars as a whole, and go back to the use of horses. Every instance of this kind produces a merchant in a frame of mind which would make it dangerous for a commercial car salesman to approach. In truth it is almost impossible for years after such an experience, to sell any kind of power driven business vehicle to one who has had such an experience.

We are pleased to see that the makers of automobiles in general recognize and appreciate that there will be an enormous future development in the motor truck field, but we are very sorry to note the speed with which some makers apparently feel that they can take the buyer by storm with an untried product. Conservatism;—this is what we urge upon the makers.

THE BREWERS AND THE TRUCK

The brewers have from the beginning shown great faith in the possibilities of the commercial car in their particular class of service. Even in the very earliest days when they purchased machines of tremendous weight, comparatively little power and high upkeep costs, they made the best of it. Instead of dropping these trucks entirely, they re-arranged their plants for properly caring for them, hired trained electricians and competent repairmen to keep them in running order and if necessary even to rebuild them. In fact several well known brewers in New York City practically did rebuild every truck they had in service.

In spite of all these difficulties the trucks were kept constantly employed and the annoying delays incident to breakdowns were overlooked, while each long haul or good service was especially appreciated. Much of the development of the commercial car as now used by brewers is due to the continuous and heart felt work of the brewers throughout the country. Never for an instant has their interests lagged, and many suggestions for improvement, which were invaluable, were given to the truck makers.

It is perhaps surprising to notice that nearly all of the brewers use electric cars in large numbers, or exclusively. This was much more true in the early days than at present, now they are taking on gasoline machines in gradually increasing numbers. There is a reason for this and a well grounded one. In the first place the electric truck of 1901 and 1902 was very much more a finished and serviceable agent of delivery than was the average gasoline truck of that time. Of all people the brewers dislike most to take on entirely new help. It was an easy transition from the horse

truck to the electric, but not nearly so easy from the horse truck to a gasoline machine. Seeing the line of least resistance, the electrics were naturally put in service. There was a feeling among the brewers that these machines were not only easier to handle, but were far more reliable, and in that early day, this was to a large extent true. Having become familiar with the use of electrics and having fitted their garages for caring for this type of vehicle it was but natural that they should continue to use them.

There was also another vital reason why the electric should be used. Brewers must of necessity keep steam up in their power plant during the night and must operate continuously, at least part of their machinery, such as the ice plant. This, of course, made it possible to arrange for charging the electrics at a cost way below what this could be done for by the ordinary truck user, who had to pay for current from an outside source. There was no similar advantage to be gained by the use of a gasoline machine.

For these reasons the electric has taken a tremendous hold on the brewers and we find it to-day exclusively used by some and forming the major part of the equipment of others. However, owing to the quicker service of commercial cars and the added range that the electrics have given over the horses, there has been created a desire to reach out and cover the territory that is just beyond. These fields have not yet been opened by many of the brewers, or if catered to at all, this has been done through the expensive medium of the railroad, with its many disadvantages such as numerous handlings, excessive breakage, leakage, etc. Now attention is turning to the gasoline machine as a means of reaching these distant points economically, and in many cases even more promptly than can be done through the railroads. The economy and the reliability of gasoline cars has now been established, and we find many of the brewers installing large units for long distance work, while the electrics cover most of the city hauls.

The brewers are certainly to be commended for their pioneer work and unremitting efforts to bring the commercial car up to its present state of efficiency. Their perseverance and untiring efforts might well be emulated by manufacturers in many other lines.

In different places in this issue are given accounts of the experiences of some of these pioneers, and by reading this one issue of the COMMERCIAL CAR JOURNAL, a very fair idea of the truck situation as regards brewers may be obtained.

GOOD THINGS TO COME

In the September issue of the COMMERCIAL CAR JOURNAL there will be some very interesting matter on the use of motor driven fire apparatus, showing how the horse apparatus is rapidly being displaced throughout the United States. The commercial car is especially suited for fire apparatus work as it stands without hitching, occupies very little space, can be operated at high speed, which means less large fires, as they are put out in the incipient stage and best of all the fact, that all this efficient service, costs far less than it does to do the same work with horses.

In this issue there will be descriptions of various recent fire apparatus and examples of the saving to be effected by the use of such machines. Much of the information has come directly to us from fire chiefs in various parts of the country and being at first hand is unusually reliable.

There will also be several articles on lubrication of commercial cars, taking up the lubrication problem from the various standpoints and showing what is common practice both in this country and abroad.

Lubricants, their qualities and action, will also be discussed.

The use of trailers with commercial cars, a feature which has not yet received much attention in this country but is used to a considerable extent abroad, will also be considered, and some very interesting examples of economy by the use of truck and trailer will be given. Road trains and tractors of various kinds, including several of the most prominent abroad, will be featured. All this matter will be liberally illustrated.

There will also be the usual news, including a detailed account of the recent Commercial Truck Run from Chicago to Detroit, by a special representative of the COMMERCIAL CAR JOURNAL accompanying the Run.

"Beasts of burden," will soon be a phrase and not a fact, in all civilized communities; the time is soon coming when our streets will be clean, noise will be reduced, the dangerous fly will be kept well under control and all work will be done by power.

This number will be found brim full of live matter of interest to all desiring transportation knowledge. Do not fail to read this number. If not subscribers, send in your subscription at once.

MOTOR HORSE AMBULANCE USES "PHILADELPHIA" BATTERY

TO THE EDITOR:

Just returned to the city from my vacation, and have read with much interest the article headed "Motor Horse Ambulances of Philadelphia and Boston," from your issue of July 15th. I find but one mistake, which I feel, out of deference to all concerned, should be corrected. The error is in the make of battery used in our electric ambulance. Instead of being the "Exide" battery, we use the "Philadelphia" battery, manufactured by the Philadelphia Storage Battery Company. This battery has been in service over fifteen months, has required no repairs and has given entire satisfaction. It is the W. M. type.

Yours very truly,

THE PENNSYLVANIA SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS,

F. B. RUTHERFORD, Secretary.

BAN ON SMOKY EXHAUST

The police of Detroit, Mich., have put the ban on the smoky exhaust and those who violate are haled into police court and fined. Two drivers in the employ of a delivery company were thus treated, one being fined $10, the other $20. In each case the explanation of the smoky exhaust was, too much oil in the crank case. It is said that the ordinances as regards this feature of commercial car operation will be enforced, and manufacturers should take care that there will be no chance for a smoky exhaust in their cars.

Electric Commercial Cars Used by Brewers of New York and Philadelphia

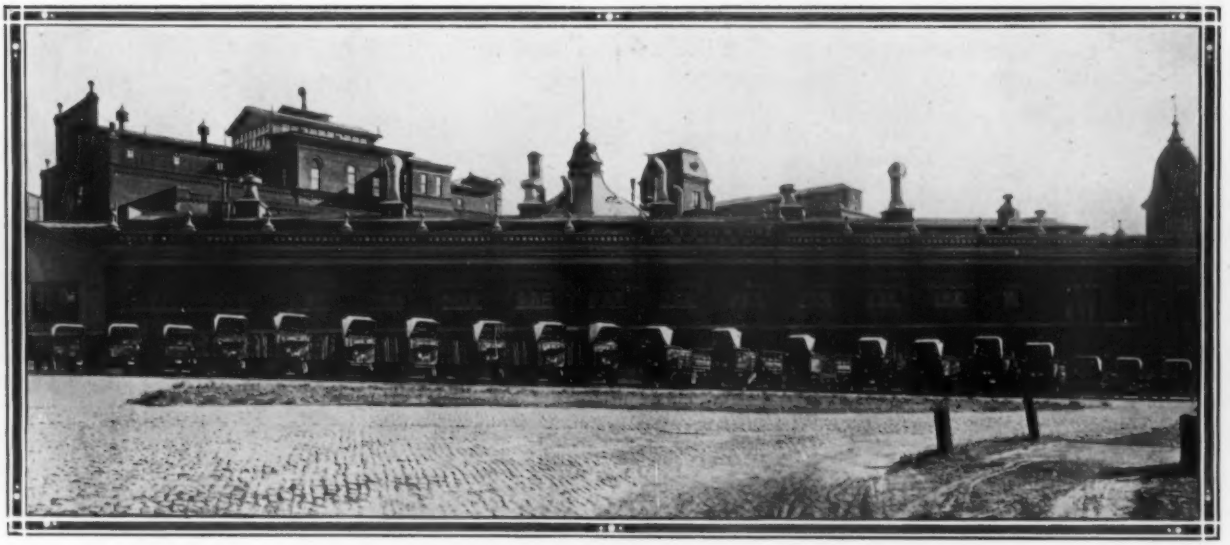
BY E. S. FOLJAMBE

IN ANY article dealing with the use of trucks by brewers, very little can actually be given as to the exact cost of delivering a fixed quantity of beer. In the first place, it might cost Mr. Schmidt so much per barrel; while in the same city, but under slightly different conditions, it might cost Mr. Schneider about one-half as much. This is one reason why figures are apt to be misleading. It is not safe to assume that because of the use of a certain make of truck one brewer is able to deliver beer at thirty cents per barrel, any other brewer will be able to do the same thing. Furthermore, very few brewers actually know the exact cost of delivering by motor truck. The machines were put in service gradually and the horses as gradually displaced, and it is only within the last year, one might say, that any of the large brewers have been without horses at all. Figures can be, and often are given, of the performance of an individual truck; unfortunately these figures are often enlarged upon to cover a much greater range than is warranted by the facts. These individual cases also serve as a basis for estimates, and too often are they based on the performance of one vehicle while doing a demonstration, where all conditions might be said to be ideal, at least far better than average conditions. Very few brewers seem to have systematically separated all of the costs which enter into the use of their commercial vehicles. In the rare instances where such itemized expense accounts are kept, the chances are that the firm will not make the figures public.

In other parts of this issue will be found articles in which figures culled from various sources are given; taken as a whole, they may be used as the basis of a good approximation as to the probable cost of delivering beer by motor-driven commercial cars. Any brewer who has not yet installed his first motor-driven truck, can easily obtain from these figures sufficient information to know whether it will be profitable for him to install such trucks.

Depreciation Usually Figured Too High

It has been the common custom, and still the custom of many, to figure the depreciation on an electric truck at 25% per year. That this is a fallacy and an injustice to the electric vehicle, has been many times demonstrated by vehicles which have been in use from five to ten years and are still in use, giving as far as can be ascertained practically the same service now that they did when new. The opinion seems to be general that tire renewals and battery plates should be considered separately and not be figured in with depreciation. On this basis 10% to 12% per year seems to be a fair estimate, borne out by the numerous cases to be found of trucks eight years in service.



Some of F. A. Poth & Sons' Fleet, Philadelphia, Pa.; which is constantly growing

Brewery Horses Depreciate Faster Than Trucks

It may sound a bit radical, but is nevertheless true, that the depreciation which must be figured on a good brewery horse is far greater than that of an electric truck. It must be understood that a horse must be in the neighborhood of six years old before he can be used in heavy brewery-truck work in the city, and that his period of usefulness for daily service is not much over four years. At the end of this time these horses are virtually "scrapped." This process consists in selling them at very reduced figures to establishments with lighter hauling, to peddlers and rag men, and to truck farmers. Heavy draft horses, such as used by brewers, will average in the neighborhood of $325 to $400

apiece, the price running sometimes as high as $450 for a single animal. When it is considered that this expensive investment ceases to be of practical service in from four to five years, and instantly, at any time during a hot spell such as was experienced in July, it will be seen that depreciation on the brewery horse must be figured between 20% and 25% per year. In New York City alone, the number of horses which died from heat was variously estimated from 1000 to 1700. Considering a horse as worth about $300, this meant an actual loss of over $500,000. Brewery horses suffered more than any others, but as other horses are included which are less valuable, this figure should, in all probability, be reduced to about $340,000, which, however, is a tremendous loss, and for which there is no similiar parallel in connection with the use of commercial cars. The rush for trucks by the brewers during and after the hot wave was unusual, some desiring the delivery of ten or twelve vehicles within a day.

One of Peter Doelger's Brewery Wagons; all of which are in constant service

Trucks Used by Doelger's Brewery

All of the brewers seem to be enthusiastic over the service rendered by their motor-driven vehicles. Peter Doelger is now using thirty G. V. electrics of 3½ to five tons capacity, and on the day the writer was in New York ordered eight more machines to put into immediate service. This company figures that by means of these trucks they have reduced the cost of delivery per barrel 27% over what it could be done for by horses. They state that each motor truck in service is saving them about $800 a year, or, in round figures, they claimed to have saved $25,000 last year. At the present time they have displaced about sixty horses; the valuable ground formerly occupied by the old horse stable is now being used for a building containing a modern bottling plant, and a shipping station has been erected at this place. A garage, accommodating twenty-four vehicles to a floor, now stands on the site of the yard where the horse trucks were stored. This progressive brewery is planning to do away entirely with horses.

Trucks Saved the Horses

M. Groh's Sons just purchased, at the beginning of the hot wave, July 1st, two five-ton G. V. trucks, which were run to their utmost capacity during the few days of the hot spell, the machines each replacing a three-horse and a two-horse truck. Each of these horse trucks had in reserve a relay of five horses, as this firm does not use a horse more than a day at a time on long-distance runs, but uses the relay horses the second day. These horses cost $450 apiece and their upkeep is estimated at about $30 per month each. The electric trucks covered as high as fifty miles on a single charge of the battery, and owing to the large amount of work which they accomplished, being placed on the long runs, and as the company was able to use as relay horses extra horses which the trucks displaced, this company did not lose a single horse by heat.

The Anheuser-Busch Brewing Association is another company which is obtaining good service from electric commercial cars. The machines are used at their various breweries, especially in St. Louis and New York. In the accompanying photographs are shown several of their panel-body vehicles, which are now in service in New York City, after having seen five years of continuous work in St. Louis. These vehicles have now been in use two years in New York, making seven years for each of them. This is only one of many cases where electric vehicles have been found which were in use for periods of from five to ten years and still doing good work.

Perhaps the first brewing company in New York City to use electric vehicles was the Central Brewing Company, which has been operating such machines for nine years. Their first G. V. truck, now in its tenth year, is in daily operation and is a familiar sight on the streets in New York.

Some of these five-ton trucks do over forty miles on a single charge of the battery. The J. Chr. G. Hupfels Brewing Company have a five-ton truck which takes fifty-two halves on the outgoing trip and returns with ninety empties, accomplishing the work of seven horses. In other words, this truck with its one driver has been doing the work of three horse trucks and three drivers, and, as may naturally be supposed, has led to the sale of several other trucks to this company.

Some Seven-Year-Old Electrics

The vehicles here shown have been in continuous service for seven years by the Anheuser-Busch Brewing Association. They are now employed in New York City

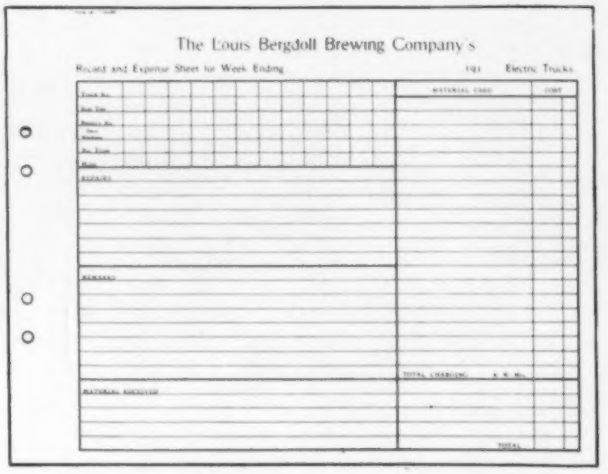
The V. Loewers Ganbreinus Brewing Company, of New York, are using daily, G. V.

trucks which are seven, eight and ten years old. Eleven of these machines are of five tons capacity, and one of 1000 lbs. is used as an emergency wagon for hauling in horse teams when they are stuck in the snow. During the hot spell it was used for hauling in stranded wagons after horses had succumbed to the heat. This emergency wagon was, of course, figured as depreciating at the rate of about 25% per year, which was the usual method with most early users, and, of course, is now operating at practically no expense. They generate their own current for charging and no record is kept of the amount used. However, aside from tires, they report that the upkeep ranges from $15 to $25 a year. The battery is made up of the best of the discarded plates removed from the larger trucks, and its cost is, therefore, practically nil. This little machine averages about fifteen to twenty-five miles a day. The company figures that the five-ton trucks each displace two two-horse teams, and that these two-horse teams each cost them formerly about $15,000 to maintain, this figure covering the horses, wagons and harness. The present machines are operating at a cost of less than $1,000 each, or, approximately, a yearly saving of about $2,000. The company formerly had between fifty and sixty horses; now, however, there are but fourteen, and these they are planning to replace with electric trucks in the fall.

"Mary Ann" Growing Old Gracefully

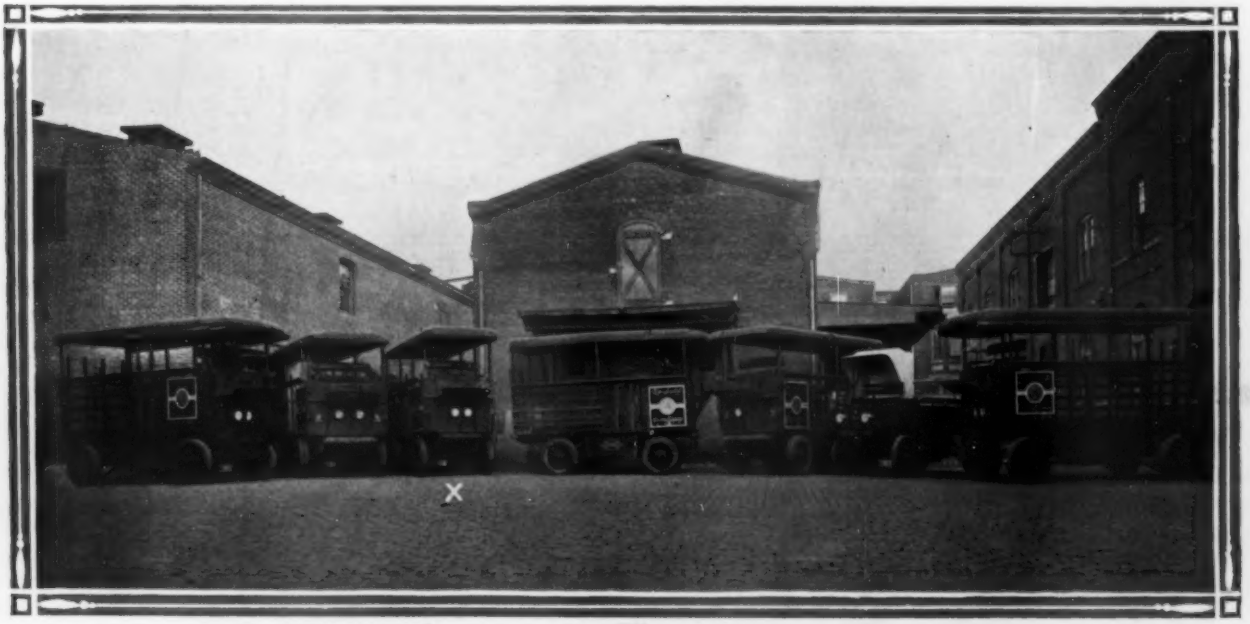
"Mary Ann"

A truck of which both the maker and user are very proud is that known as "Mary Ann," which was built in the year 1901, by the Vehicle Equipment Company, predecessors to the General Vehicle Company. This faithful old machine has been in service for the Central Brewing Company, of New York, for over ten years, and is still on the job, covering thirty miles per day on a suburban route and costing less than $100 a year for repairs, aside from tires and battery. "Mary Ann" runs every day, even during the winter. To show what excellent condition the machine is still in, it was entered in the Commercial Motor Vehicle Contest held last Fall in New York City, under the auspices of the New York *American*, and came through with a very creditable score and was ready for work the next day;


The Louis Bergdoll Brewing Company's

Record and Expense Sheet for Week Ending 191 Electric Trucks

Expense Sheet Used by Bergdoll Brewing Company, in Keeping Records of Cost of Operation



Group of Electrics Used by the Bergdoll Brewing Company

This Philadelphia brewery has been using trucks for many years and has gradually increased the equipment, until seventeen are now in service. The machines here shown are manufactured by the General Vehicle Company, Long Island City, N. Y., and range in capacity from one up to five tons. The machine marked with an X ran four years without missing a day.

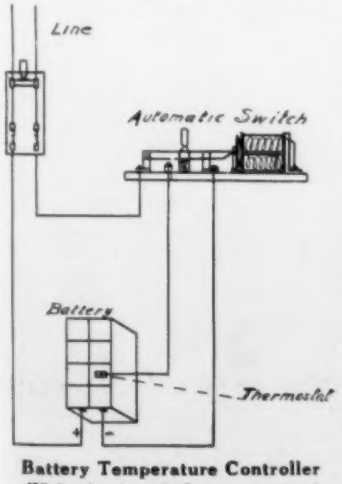
and to-day is hauling beer for less money at greater speed and in larger quantities than ever could be accomplished by horses.

First Philadelphia Brewer to Use Trucks

The Bergdoll Brewing Company, of Philadelphia, were pioneers in the use of trucks in that city, putting their first machines in service in 1903; all of their vehicles are electric. Eight of these are G. V. trucks and two are by the Commercial Truck Company of America, one of the latter is a 3½ ton four-wheel-driven machine, while the other is a small one-ton worm-driven truck which has been in service now over a year and is said to be extremely satisfactory. The small trucks are run from fifty to sixty miles a day on an average, and one of the two-ton trucks has made as high as sixty-two miles in a day. The large trucks run from twenty-five to twenty-eight miles a day. After the machines have run about forty miles they are "boosted" or given a slight additional charge. Some of them average as high as five trips a day. One of the longest single trips is that to Chestnut Hill, Clifton, Springfield and Fox Chase, leaving at six o'clock in the morning and returning about five at night. The small worm-driven truck before mentioned has been in operation day and night for the past few weeks, and has only been in the garage about five hours a day out of the twenty-four, just sufficient time to charge and "boost" the battery. Two drivers are, of course, employed, and the car is used to take care of rush orders and extras, it being capable of a speed of about sixteen miles an hour.

A Corner of the Garage

View of a corner of Schmidt & Sons' garage, showing raised cement curb between the stalls; also a truck over the pit; and at the left, two of the charging boards



Battery Temperature Controller

While charging, the temperature in the battery rises, and if the battery is in good condition it will be charged when the temperature reaches the degree required by the battery manufacturers; at which temperature the thermostat closes the battery circuit and causes the automatic switch to open, which in turn opens the charging circuit and also the battery circuit, and thereby prevents the battery from overheating and deteriorating.

As is customary with brewers, the Bergdoll Company do their own charging, and figure that this does not cost them as much as two cents per kilowatt.

While the writer was talking with Chief Electrician F. C. Bauer, who is in charge of the machines, truck No. 137 rolled in, and he remarked, "There is the first truck to be used by a brewer in Philadelphia. It has been in continuous service for us since 1903 and has run for four years without missing a single day."

The comparative amount of work accomplished by these trucks was discussed, Mr. Bauer estimating that a two-ton truck easily displaced not only four horses and a wagon, but did the work in considerably less time. If horses are driven on a twenty-four-mile trip they must be changed and relieved; the truck goes the twenty-four miles and gets back in plenty of time for another trip of eighteen miles or so. No trucks whatever are kept in reserve, all machines being kept on the road all the time. The Bergdoll Company still has about ninety head of horses and operate eighteen regular wagons, with six or seven in reserve, but are gradually displacing the horses with trucks.

The Drivers

One feature which particularly appeals to the brewer, in favor of the electric truck, is the fact that he can put almost any of his old horse drivers on a machine, at even short notice, with satisfactory results. These men are glad to drive motor trucks, as there is less work for them to do upon their return at night, there being no horses or harness to look after. The motor trucks, at the close of the day, are simply run into the garage, unloaded of the empties and left to the care of those in charge. Most of the drivers take an active interest in the machines which they handle and no greater punishment can be meted to them, or will bring them to terms quicker, than to put them on one of the

Small Worm-Driven Truck Used by C. Schmidt & Sons Brewing Company, Philadelphia

This small truck is one of the Commercial Truck Company of America Vehicles fitted with worm drive, and is in daily service, not only in delivering beer, but also as an express wagon for rapid work, and as an emergency car when necessary.

horse wagons to handle the reins. After a few days of this kind of discipline they are ready to go back to the truck and do whatever is required. The wages paid the drivers are the same whether driving motor trucks or horses.

The night man, who charges the cars, also inspects them and reports, in writing, anything which needs attention. A regular daily report is made out on a weekly card, which is then turned in to the office and copied to a permanent record sheet. On this sheet is kept the going out and coming in of all cars, costs of repairs and parts, charging, etc.

Seventeen Trucks Used by Schmidt & Sons

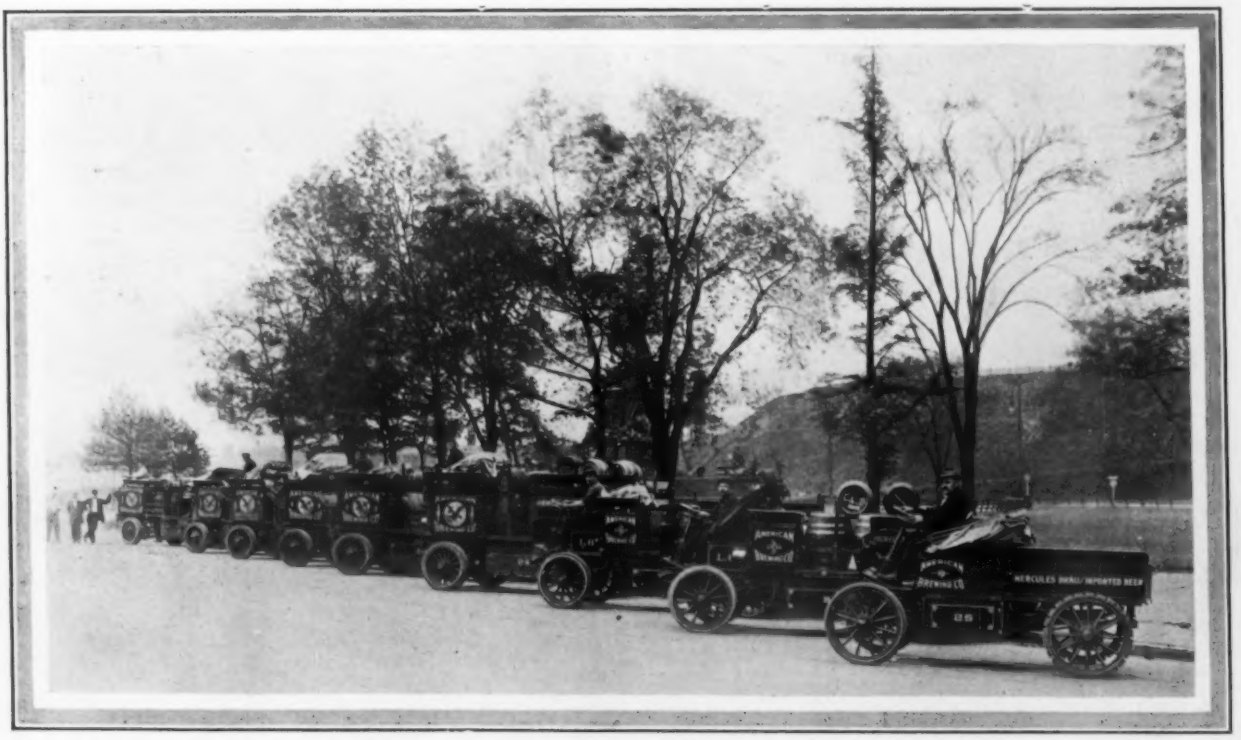
The C. Schmidt & Sons Brewing Company, of Philadelphia, now have in use about seventeen electric trucks which have been in use for over a year, with very great satisfaction. They range in size from two to five tons. This company takes care of its own equipment and thoroughly believes in hiring a competent man to take charge and cites as an example of the results of trying to utilize a cheap man, the case of another brewer who when he first installed motor trucks, worked in an incompetent man. The trucks very soon were out of commission and cost many times for repairs and replacements what the extra salary would have amounted to for a competent foreman.

More Satisfactory Than Horses in Winter

This picture shows a four-wheel-driven Commercial Truck Company of America vehicle operating through heavy snowdrifts; in the service of the American Brewing Company, which company has entirely dispensed with the use of horses.

A special garage was built about five years ago with a capacity of about eight machines. This is now, of course, entirely inadequate, and a much larger one will probably be erected in the near future.

One feature of the use of trucks by this company and one which could well be followed by all other commercial vehicle users, is that of equipping each vehicle with a recording instrument, those used by this company being the International. These instruments are on the front of the machine, in a small steel case and are flexible-shaft operated from a front wheel. On a disc is recorded every movement of the machine, showing how fast and how far they travel, and also indicating the



A Group of Commercial Truck Company of America Vehicles in Use by the American Brewing Company, Philadelphia

This is probably the first brewing company in America to entirely dispense with the use of horses. The antiquated quadruped is only used by them for hauling ashes, all beer being delivered by electricity at a considerable saving to the company over their former methods

length of each stop. With such a device on the trucks, long stops and subsequent hard driving, to the detriment of the machine, are entirely prevented.

As in other breweries, the practice here seems to be to keep all of the machines on the road all the time. A small one-ton worm-driven truck of the Commercial Truck Company of America is kept for express service and for night work, or for relieving any of the other machines which get into difficulty. If a truck is in difficulty near home, the load is sometimes transferred to a horse wagon, but if at any distance, another machine goes after it, or the little car, with a repair kit, is hurried to the scene at once and the truck put in running order again. Mr. Geiss, who is in charge of the vehicles, states that this little worm-driven machine has given excellent satisfaction and is capable of very rapid work.

F. W. Schmidt, of this firm, invented for the use of the company and later placed on the market, a device for automatically preventing overcharging and damage of batteries. This device consists of a thermostat which will act to throw off the charging current at any temperature of the electrolyte, at which it may be set and sealed, so that it cannot be tampered with. Thus, when batteries are being charged and the temperature rises to a point which indicates that the battery is fully charged, the device automatically cuts off the current and prevents the battery from being damaged. If the batteries are out of order and heat up too soon, this condition is also indicated.

The American Brewing Company, Philadelphia

About three years ago the American Brewing Company, Philadelphia, installed their first commercial cars and are now using ten machines, ranging from 1½ to five tons capacity. They take care of their own equipment, having their own garage and systematic inspection each night. The trucks are also inspected when in at noon.

Farm Horse to Ex-Brewery Horse.—Why do you always run over to this fence and look at that truck every time it goes by?

Ex-Brewery Horse.—If it wasn't for that truck I would still be hauling all that beer up this hill myself. I'm getting ready to "hike" if she ever breaks down.

All Horses Have Been Displaced

In this brewery no horses are now used, except to pull the ash carts,—the entire horse equipment having been displaced by electric commercial cars. The service has been extended and everybody is better satisfied.

While the writer was at this brewery a small truck came in from a long trip, having made a large number of stops in various parts of the city, as far as to Point Breeze and return. In was just four o'clock, the truck having left at two. The exact distance covered was not known, but the driver said if he had to do the same work with a horse truck he could not possibly have returned before eight o'clock in the evening. This is very typical of the use of commercial cars and of the way in which drivers speak of the trucks.

All charging, of course, is done by the company, at night, by the engines which must be run to take care of the ice plants, etc. This so reduces the cost of current that the same is estimated at less than two cents per k.w. A small Commercial Truck Company of America vehicle, which is worm-driven and capable of from fifteen to sixteen m.p.h., is used as an emergency, and for express purposes. This is the first year that the company has been entirely without horses, and some interesting figures can probably be obtained at the end of the year. As with all the other brewers interviewed, this company is well satisfied with the service which they are getting and make the statement, "All our machines are giving satisfaction and are not only proving quite as reliable in all weather as horses, but we are deriving considerable economy from their use."

Fischer Motor Car Company Takes On Universal Truck

THE Universal Motor Car Company has announced their agency in Philadelphia, Pa., as the Fischer Motor Car Company, of Eleventh and Wood streets, who will act as distributors for the Universal Commercial Car in Philadelphia and surrounding territory.

This company has one of the finest equipped machine shops in and about Philadelphia, which will enable them to give as good service as can be obtained in the commercial car line.

Mr. William Fischer, the mechanical engineer, has been in the machinery business for more than eleven years, manufacturing parts for both pleasure and commercial cars.

He recently invented an automatic power hoist for dumping bodies on cars, this device taking its power from the engine. The construction is fool-proof and entirely automatic in the raising and discharging of the load, the whole operation taking about 22 seconds. With this construction the power required for raising a 4-ton load to the dumping angle is only 1¾ h.p.

Mr. Fischer immediately saw the possibilities of such a power hoist as applied to commercial cars, and this prompted him to select the Universal truck as one of the best and strongest cars for this hoist.

Mr. John Harrisberger, the construction superintendent, has been connected with the Fischer interests since the incorporation, eleven years ago, of the Fischer Machine Company.

Mr. Theodore L. Grabe, who is connected with the Fischer Motor Car Company in the sales end of the busi-

ness, has made the commercial car a study for more than five years, and has a wide acquaintance throughout the country with automobile dealers. Prior to his connection with this firm he became familiar with automobile requirements by selling machinery to automobile manufacturers in both this country and abroad. He was also connected for four years with a prominent Philadelphia automobile specialty house.

A Universal Truck Demonstration for Brewers

The Univeral car has many unusual and unique features which have been favorbly commented upon by technical automobile men. The car has a good appearance, as shown by the accompanying photographs, which were taken during a brewery demonstration in Philadelphia. It is staunchly built, has a powerful motor and flexible control. This particular demonstration was typical of what can be done with a commerial car as compared to horses, and is worthy of consideration. The demonstration was made for the Arnholt & Schaefer Brewing Company, the largest bottling house in the city. The load carried was 185 cases of beer, each weighing about 60 lbs., making a load of over 5 tons. The elapsed time for the machine was 11 hours and 30 minutes, of which 5 hours and 24 minutes was actual running time, and 6 hours and 22 minutes the machine was standing. A distance of 46 miles in all was covered, at an average speed of 8.5 miles on 8¼ gallons of gasoline, making about 6.6 miles per gallon. The remarkable part of this demonstration consisted in the number of stops which were made, there being 83. As this record is typical of what a truck can do in the service of a bottling company, extracts of it are herewith given in tabulated form.

Record of Demonstration of Three-Ton Motor Truck

FISCHER MOTOR CAR COMPANY, INC.

Made for the Largest Bottling House in Philadelphia

JULY 20, 1911

CALLS	TIME ARRIVED	TIME LEFT	TIME STOPPED	TIME RUNNING	ODOMETER READING	MILES RUN
Garage	.....	6.45	.....	.....	1 00	.....
Brewery	6.58	8.00	2	13	2 7-10	1 7-10
North Phila.	8.20	8.25	5	20	8 6-10	5 9-10
	8.26	8.31	5	1	8 7-10	1-10
	8.35	8.37	2	4	8 8-10	1-10
Thirty-five stops between 8.35 and 12.51						
Jenkintown	12.51	12.57	6	1	20 9-10	12 1-10
	12.51	12.57	...	...	.....	.....
	12.51	12.57	...	...	.....	.....
	12.59	1.00	1	2	21 2-10	3-10
Wyncote	1.01	1.08	7	1	21 9-20	5-20
	1.09	1.10	1	1	21 3-10	3-20
	1.15	1.20	5	5	22	7-10
Eight stops between 1.15 and 2.15						
Jenkintown	2.15	2.20	5	3	24 3-10	2 3-10
	2.25	2.30	5	5	24 6-10	3-10
	2.31	2.40	9	1	24 7-10	1-10
	2.40½	2.47½	7	½	24 17-20	3-20
Backed up one block	2.49	3.00	11	1½	24 9-10	1-20
	3.01	3.02	1	1	25	1-10
Nine stops between 3.01 and 4.23						
Wyncote	4.23	4.25	2	2	27 3-10	2 3-10
	4.37	4.39	2	12	28.3-10	1
	4.45	4.50	5	6	29 1-10	8-10
	4.51	4.53	2	1	29 5-10	4-10
	4.55	4.58	3	2	29 6-10	1-10
	5.00	5.05	5	2	30	4-10
	5.08	5.10	2	3	30 4-10	6-10
	5.10	5.15	5	0	30 5-10	1-10
	5.20	5.35	15	5	31 3-10	8-10
Fox Chase	5.38	5.45	7	3	31 5-10	2-10
	6.11	6.15	4	26	36 2-10	4 7-10
	6.18	6.23	5	3	36 6-10	4-10
	6.25	6.31	6	2	37 1-10	5-10
	6.50	6.55	5	19	40 5-10	3 4-10
Brewery	7.30	.....	.....	35	47	5 5-10

Weather conditions ..... Good
Road conditions ..... Fair
Kind of load ..... 185 cases of beer
Weight of load ..... 10,175 lbs.

RESULTS

Total time elapsed .... 11 hrs. 30 min.
Time stopped ..... 6 hrs. 22 min.
Net running time ..... 5 hrs. 24 min.
Total number of miles 46
Average miles per hour 8.5-10
Number of stops 83
Gasoline used ..... 8¼ gallons
Lubrication oil used ..... 3 pints
Cost for supplies $1.43
Miles per gallon of gasoline 6 6-10

Judging from the large number of sales made in Petaluma, the famous poultry district of California, a motor truck is now a necessary adjunct to successful chicken raising. It is estimated that in the hauling of feed and poultry one truck can do the same amount of work in much less time than three two-horse teams.

Universal Truck Delivering Bottled Beer

Two views of the Universal Truck during a recent demonstration for the Arnholt & Schaefer Brewing Company, of Philadelphia. One hundred and eighty-five cases, or a load of about 10,175 lbs., was carried, eighty-three stops made, and a distance of forty-six miles covered in one day

Unit Construction

The Ultimate Solution of Continuous Commercial Car Delivery

BY E. S. FOLJAMBE

THE pleasure car owner thinks nothing of laying up his machine for a week, or even ten days, awaiting a part, but if this same thing happens to a commercial car user, there is immediately a time with the agent or the manufacturer of the machine, because this inactive truck is in all probability causing a loss to the owner of anywhere from ten to twenty dollars a day, while the pleasure car owner was simply inconvenienced.

It is generally conceded that something must be done in the car field which will positively do away with expensive delays occasioned by the necessity for renewing vital parts of the mechanism. It is true that careful daily inspection and up-to-date service department and relief methods make it possible to keep a well built machine almost continuously "on the job." Yet in spite of these precautions, expensive and annoying delays will occasionally take place.

Removable Units

It is very gradually dawning upon designers that the removable unit system is a sure cure for all these ailments. Some designers actually believe they are using removable units in the cars of their construction. The question arises what constitutes a removable unit? Is an engine which is bolted and lock-nut and cotter pin retained in the frame, a removable unit? Certainly it is not in the sense in which we use the term. Under such a definition almost any part of a vehicle might be termed a removable unit. By "removable" we do not simply mean that in half an hour or an hour a crew of men with a machine equipment back of them can remove the offending part, leaving an aching void in which nothing will fit. Such a removable part has no place in rapid commercial car transportation. To be really removable the part should be so arranged that strapped, winged-nut and cam fastened binding or holding parts are all that are required to firmly anchor the removable portion in place. The alignment and the positional relation of the part to the rest of the mechanism should be automatically cared for by the mere act of tightening the strap, wing-nut or cam binder.

Dowels should be freely used, the holes for them being jig located so that perfect alignment would be a matter which need not concern inexpensive operators on the road while replacing units.

All units in a power transmission line should be interconnected by flexible couplings or universal joints as it is out of the question to so design a frame that all parts can be held in rigid relation to each other. To attempt this is not only futile but adds unnecessary weight and cost to the construction and serves no useful function. Although the average road conditions in Europe are infinitely superior to those in our own country and, therefore, the weaving of the frame is very much less, the suggestion has even been made by foreign designers that a diametrically opposite course should be pursued and the frame actually pivoted, jointed or otherwise flexibly united, to allow entire freedom of motion in truck frames. Whether such an extreme will be adopted it is difficult to predict, but it is certain that heavy bodies as used on commercial cars are subjected to very great stresses, due to frame distortion. From the same cause working parts are often caused to wear out prematurely or produce laboring in the engine.

The Future Emergency Wagon

Those companies in which a large number of vehicles are employed were naturally the first to recognize the importance of maintaining a systematized and ever ready service department. The service department undoubtedly is one which will grow tremendously in its importance as the number of commercial cars in daily use grows greater. The service car with its lockers, extra parts, ropes and other emergency gear is rapidly becoming a feature of commercial car work and does not throw any discredit on the motor truck, but like the shock absorber of the spring, is recognized as a necessary and important adjunct. No service is so exacting, on a delicate mechanism as that of commercial car transportation over the abominable city pavements and country roads of this country. The street car running over a steel rail of billiard table smoothness, the locomotive under even more favorable conditions are always overhauled at smaller mileage periods than the commercial car, and each of them has its service car. Why not the motor truck?

The service wagon of a delivery system should not only carry individual parts, but should be arranged to take any of the units which go to make up a complete truck. In other words, if the commercial car is actually made up of removable units it will be a matter of a few minutes to install a new engine, transmission, rear axle, front axle or jack

shaft. As a rule, however, a little investigation shows that before they can be removed, the oiler, the muffler, the electrical and water connections and perhaps the radiator must each individually be taken out, or disconnected. Such a removable unit is a farce; it is not removable in any sense which will make it an accelerator in the motor truck transportation field.

The really removable power plant can be taken out in a jiffy, arrangements being made for it to slide on wheels and tracks and not by lifting it out by brute strength. A few fastenings of ample size, quickly removable, as before suggested, hold it in place, and the numerous water and electrical connections do not have to be broken, but are made up automatically.

The change speed gear, jack shaft, rear axle and springs, front axle, steering gear, etc., should each be really removable as here suggested. When a telephone message is received for any of these parts, it would be a simple matter with such a construction to take out the old and replace it by a new unit, and these operations should not in any way necessitate either the removable or even the shifting of the load.

It may seem to some that these are rather radical statements, but there is very little doubt but that these rapid renewal possibilities must be perfected before the best can be hoped for, from a commercial car installation.

An Example of Long Hauls

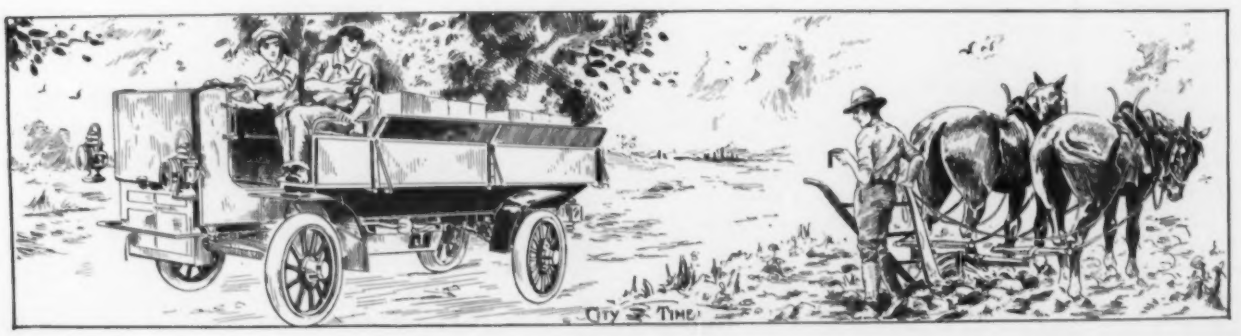
Many house-moving firms have taken to the commercial car as a solution of the long-haul problem. Among these may be mentioned the American Storage Company, 604 West Forty-eighth street, New York City. This firm does a general household furniture moving business, and about two months ago put in service two three-ton Mack trucks. These cars make from one hundred to one hundred and twenty-five miles daily, frequently making trips to Nyack and other points thirty to forty miles distant. It must be understood that on long hauls the actual distance to a suburb is far from being mileage which must be made by the machine. Many times several miles have to be covered in the suburb itself, and round-about routes taken which greatly increase the total distance traveled; thus a round trip to Nyack, which is called thirty miles by railroad, may easily total seventy-five miles. The statement was made that distances as great as sixty miles had previously been covered with horses, but both men and horses had to put up over night, which was expensive, and two days were required.

One of the American Storage Company's Three-Ton Trucks, now in daily service in New York City, moving household furniture

Horses are not good for over twenty miles if they are to be used in heavy work the next day. They do not average over three to three and a half miles per hour, while the commercial cars make from ten to fourteen, and each carries about a van and a half for a load.

The drivers are paid $25 per week and do all minor repairing, putting in any parts which have to be replaced, the more difficult repairs being taken care of by the makers. However, it is stated that up to the present time there have been no serious repairs required, tire troubles having been the chief difficulty. The cost for garaging is given as about $180 per month, and the amount of gasoline used per month per machine varies from three hundred to over four hundred gallons.

The work of the cars has been very satisfactory and has brought in orders which would not otherwise have been received. In fact, the motor trucks are preferred, but, of course, as distant hauls can be made in much quicker time and better service is given with them, the prices charged are somewhat higher. The company expresses itself as being well pleased with the work being done, although feeling that they have not yet had the machines long enough to know how to record depreciation.



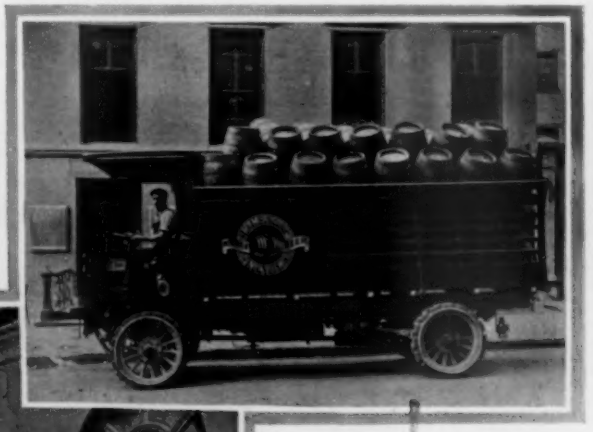
Successful Commercial Car Operation as Reflected in Brewery Service

Brewers as Factors in Commercial Car Development

BY WILLIAM J. JOHNSON

THAT individual or organization, with deliveries to be made promptly, having been convinced of the limitations of horse service, is very obviously interested in any system that will better conditions; and that system is the commercial car. Those not employing such equipment and realizing the imperative need of it, very naturally cast about for information from those who have been using cars. If a certain car service is good, or appears to be, that is the one that is sure to be selected as a model. Those interested will make it a point to interview him who has a successful commercial system of delivery and collection.

This Cut Shows Disposition of Barrels on Bottom of Wagon and Case Goods Above the Barrels.



A Weighty Load Neatly Piled. This truck can be seen daily in service in New York City, carrying such loads.

Still Another Method of Piling Load. Note barrels carried on hooks attached to runningboards and frame

Of all classes of users who are in a position to impart this information the brewers are prominent, since many of them have used commercial cars since their inception. Many times this information does not materialize as easily as might be hoped for. Brewers, as a rule, appear to be somewhat reticent about imparting information on the details of their service, especially the actual dollars and cents story. But this statement must not be construed to apply to the whole field of users.

If the user of a car who has had good service tells a prospective buyer that his service is good, that his car is in every sense satisfactory, the statement will be accepted. On the other hand, were that same statement made, word by word, by a salesman, he who was informed would have a desire to turn on the limelight and analyze it from beginning to end.

The Early Electrics

Electrics were conspicuous in the first domestic efforts in commercial car construction, and many of those old cars may be found in service to-day, carried along from year to year by a thorough system of overhauling and repairing. It is a safe assumption that there are but few things about construction, maintenance and the like unlearned by those first in the field of electric car use. In those days, just as now, it was the individual user who proved to the interested prospective buyers whether or not the construction was right. If a certain type of car proved unfit, a duplicate was hardly likely to be installed in service.

Getting Away from Stable Methods

One of the things that brewers have learned is that stable and commercial car methods cannot be successfully merged; things that properly apply to one will not work with another. This brought about a more painstaking method of caring for cars: the man in charge necessarily became versed on what to do and learned what not to do.

Organization and Drivers

Considering the best service, there appears to be one important feature of brewery commercial car operation: that is organization. In a certain sense, a brewery is like a large family. The same crew is on deck year in and year out; interests are fostered, conditions are improved; one hardly

ever hears of a protracted brewery difficulty. This all tends toward the building up of an organization and the promotion of better feeling. To the writer's knowledge there are certain instances where the same men have been on the pay roll for years. Obviously they must be fairly well content with their berths or they would seek other employment. This also applies to the drivers, who make or break the service. For obvious reasons which hardly need be discussed here, brewery commercial car drivers are taken from the ranks of the teamsters, but with a competent man in charge of the cars the service proves satisfactory. The writer, not long ago, interviewed a large concern on this very point, and while admitting that they were, in a sense, restrained in the selection of drivers, to the team ranks, the teamsters, properly instructed, did very well on the cars. The statement here was that the men actually took an interest in their work; being placed at the wheel of a car meant increased wages, and then, the men having been in the service of the concern for years, knew what to do and when to do it.

Wherein the Service Differs

Brewery service differs from others in many respects. There must be an effective delivery system, and it has been amply demonstrated that service with cars is superior to that with horses, since the former will do at least twice as much as the latter in the same time.

A prominent feature of brewery work is that the cars are active in two directions, that is, going and coming. In other words, a vehicle leaves the base with a load, and, as a rule, also returns with one, for the reason that where full cases, barrels and bottled goods are deposited, at that same place there will be a collection of empties, and these run into weight; so that it is ostensible that the car is twice as effective as would be the case in some other field.

Delivery must of necessity be effective and be made with the shortest possible time allowance. This gives rise to a system of routing. Where there is a fleet of cars in use each car has a certain field to cover and the driver knows just about how much time he will be allowed to cover it in. So does the garage manager.

Three Classes of Service

Service may be reasonably divided into three classes: A—light city delivery, B—heavy city delivery, and C—suburban runs. In the light delivery service small cars are employed to convey bottled and case goods; in some instances these cars are kept for delivery of special light hurry-up orders. If a customer at the other end of town desires a few cases in a hurry, there is no use putting them on a heavy car and delivering them, say an hour or two later. These light cars, usually equipped with pneumatics, can make the trip over and back in a short time and the large car is spared for routine work.

A Good Example of Full-Case Load. Cars of this type in this service make long suburban hauls. Also another truck loaded with case goods, showing method of piling.

City delivery proper is left to the larger cars which carry from two to three tons, the idea as to body best suited to the work differing according to the locaton of the town in which the car is used. In the main the result is the same, no matter where the car is in service. In heavy service the driver has a certain route to follow, he and his car are the feeders for customers along that route, and as he delivers the supplies he also picks up the empties, so that at the conclusion of the active work he has a load to return.

Long Hauls Without Railroads

Another feature of brewery service is that much of the business that formerly went to the railroads is now done with commercial cars of about three tons capacity. There are many instances in which the carriers travel thirty-five and forty miles from the base, making a round trip of sixty miles and upwards. A real good car can make, in a day, two of these suburban trips and return loaded each time.

Gasoline and Electric

From interviews with various concerns it is plain that the subject of proper equipment has been well thought out.

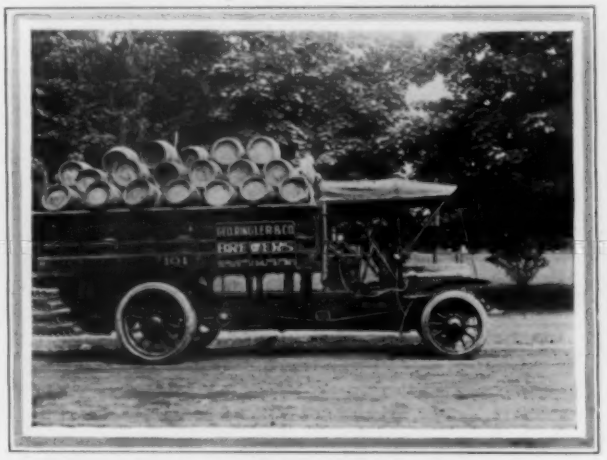
As to whether gasoline or electric cars are used, seems to depend entirely on the service. Where long suburban hauls are made the gasoline car is, of course, utilized; in city work, electrics. In some services the equipment is exclusively electric, in others gasoline. But either way the cars are selected in accordance with the needs. A brewer recently interviewed by the writer, expressed a preference for electrics, as he thought it was too much trouble to stop and start a gas car. He was of the opinion that gas car manufacturers must equip their vehicles with some sort of a starting device. He is using both types.

Methods of Care

When a concern is using two types of car, it is obvious that there must be some effective means of caring for them. As a rule, charging is done on the company's premises, since the firm generates its own electric current. In the more isolated services the cars are stored in a public garage. The majority of users, however, prefer to care for them on the premises. In some services the quarters in which these cars are stored are up to date, wired with charging plugs at convenient intervals, with individual control over each charging line; repair pits, full machine equipment, and the like. To say the least, it is realized that the better care given a car, the better work it will do.

Typical Service

A typical mixed service is that of the Anheuser-Busch brewery, at St. Louis, Mo. This concern has a plant which covers one hundred and twenty acres, employing six thousand people. Here cars are properly cared for, and there is so much to the story that it is a part by itself, and will be discussed in detail in a future issue of the COMMERCIAL CAR JOURNAL. This company was among the first in the field to use commercial cars and the equipment is excellent. There is every facility for caring and repairing. Electrics are stored on one side of a specially built garage, gasoline on the other. Charles A. Marien, one of the best-versed men on the care and operation of electric and gasoline cars in brewery service in this country is in charge of the garage and cars, and has an effective system of keeping track of each vehicle.



An Expensive Imported Truck Used in New York City
Note the method of piling the load

Use High-Grade Cars

One may be inclined to ask whether the brewers use high-grade cars. Without question they do. This is obvious from the fact that of one high-priced gasoline truck alone, in thirty cities fifty-seven brewers are using one hundred and nineteen cars. Some idea of equipment in various parts of the country is to be had by reference to the accompanying illustrations. Mechanical plants in various concerns are of the best; the delivery equipment must be in keeping, for if the productive plant is satisfactory and does the work thoroughly, it follows that the delivery equipment must be likewise; one is as essential as the other. Sales of high-grade cars to the brewers are frequent occurrences; old equipment is being supplanted by new; service is being bettered; the lessons learned in the old days are being heeded. More competent men are now found in charge and satisfactory service is the result.

Anheuser-Busch Typical Successful Service

There are many breweries throughout the United States which now rely to a great extent upon commercial cars to make deliveries of cased, bottled and barreled product, and of these the Anheuser-Busch Brewing Association, at St. Louis, Mo., stands preëminent. This concern was among the very first to employ commercial cars, these being of an electric type, which was, at that time, conceded to be the one holding forth the most promise. From this it is obvious that the Anheuser-Busch service is one reflecting experience. The success of this service is due preëminently to a sound method of care and repair of cars. This recalls to mind the statement recently made by a maker's agent in the presence of the writer, to the effect that when a car was here sold that ended the matter; it went and continued to go. Now then, one must dig below the surface to ascertain why the Anheuser-Busch cars are perhaps doing more satisfactory work than similar types and makes in other services.

A Three-Ton Commercial Car With a Full Load of Bottled Goods

Method

Here, as in almost any line of business,

A Large Worm-Driven Pierce-Arrow Truck; in use in Milwaukee, by the Pabst brewery

success is due, to a great extent, to a common-sense method of caring for the cars. Things are not done half way, they are done right. It is fully realized here that to only partially perform a task is worse than not to do it at all.

Garage Manager

The Anheuser-Busch service embraces fifty-six cars at the St. Louis plant, and of these six are three-ton, gasoline, four-cylinder, four-cycle types of standard make. These vehicles are entrusted to the care of Garage Manager Charles A. Marien, who is one of the best-versed men on gas and electric commercial cars. He has worked up a system of caring for the cars, and repair work is done when it is needed, not hurriedly, but in such a manner as to make attention effective.

Modern Garage

The Anheuser-Busch garage is a modern brick structure, well designed and lighted, with ample space, which allows for future growth of the service. There is a main garage for the commerial cars, as well as a smaller one for the pleasure cars, a fully-equipped battery department, machine shop, stock room, and the like. There are several entrances to the main building, which is a one-story structure, so that cars may come in one door and pass out through another. The garage floor is brick, and there are ample facilities for washing the cars.

Machine Shop

The machine shop is, approximately, 120 x 60 ft. and is well lighted. The equipment embraces up-to-date machinery of approved type. There is a wheel press, grinder, two engine lathes, two drill presses, shaper, milling machine, and the like. There is an abundance of bench room and the working men can move about without being in one another's way. The repair pits will accommodate three cars each, twenty steel girders being employed for wheel tracks. Pits are lighted by electricity, so that there is ample light by which to work under the cars.

Interior of Anheuser-Busch Garage

A large fleet of cars is here cared for by experienced men. A long pit is bridged by channel irons, upon which the cars are run

Battery Department

The battery department is well equipped for the care of batteries, and there are five switchboards. All cars in service can be charged at one time with individual control over each line. The charging plugs are conveniently arranged about the garage. The electric cars are kept on one side of the garage, the gas types on the other, so that the two are, in a sense, separated.

The batteries, after having been fully cared for, are run about the garage to the vehicles on four-wheeled trucks hand-operated.

Stock Room

The stock room is a good example of the proper way of doing things and contains no end of parts for cars in service. If a part breaks, the car need be laid up only long enough to substitute a new member. This department is about 40 x 60 ft., the bins and racks being steel, each numbered. An accurate record is kept of parts, and material is passed out on requisition. It sometimes happens that it is more economical to manufacture parts on the premises, and this is done when such happens to be the case or when there is a rush. This is easily accomplished, since there is a good machine-shop equipment.

Electrics for City Service

The electric trucks in this service are used about the city of St. Louis and are kept constantly on the move. The plant is located some distance from the center and the roads traveled might be better than they are. The daily mileage is about twenty to thirty.

Gas Cars for Long Hauls

It has been found expedient to make liberal use of the gas cars for long-distance work, and these cars now carry much of the product that formerly went to the railroads. These vehicles average at least forty miles a day; by means of them outside sections rather remote, are conveniently reached in the course of a day and make deliveries which could not be done as conveniently by other methods. Frequently a gas truck will make upwards of sixty miles on a round trip, and on such runs there is usually a load coming and going, a full load out and a load of empties on the return. Empty barrels weigh almost as much as the beer itself.

Barn Boss Looks After Drivers

The garage superintendent has his own department to look to, the drivers coming under the supervision of the barn foreman. He keeps a close watch on them, so that the service of these men is quite satisfactory. With this arrangement the garage manager is relieved of what is frequently a perplexing problem in most services, and can give his whole time to the garage and its management.

Office Records

It follows that a garage of this size would require more or less accurate records. There is a record of everything; it is known when a thing was done, and why it was done, and how much it cost. If repair work is done in the machine shop it is known to a cent just what it cost. All other features of the service where records are required are equally well cared for, as in the stock room, for instance. This has helped materially to improve the service and bring it up to the present satisfactory point.

Three-Ton Truck in the Service of the Berghoff Brewery, Ft. Wayne, Ind., being loaded with case goods

Useful for Long-Distance Work

Commercial cars for long-distance work are well favored by the Berghoff brewery at Fort Wayne, Ind., which concern has lately added a two and a three-ton Gramm to the equipment. The Chicago branch of the concern also uses two White cars, one of five tons load capacity, the other of 1½ tons. The Berghoff brewery is situated on the outskirts of the city of Fort Wayne and the roads leading to the city are good, much of the way being level asphalt. This concern, while classed among the smaller companies, does a big export business, to say nothing of a bristling local trade. The two Gramm and the one Reliance truck are kept pretty busy throughout the day. Trips are made well outside the city with full loads and there are usually plenty of empties to return, so that the cars are useful in two directions. In both the accompanying illustrations of the Gramm trucks it will be noted that there is a good-sized load of empties.

The company acquired its first car three years ago. It is estimated that the cars will depreciate at the rate of 20 per cent. When asked as to relative costs of operation of horses and commercial cars an official of the company responded to the effect that the car service was very satisfactory, there had been some unpleasant things to contend with, which had been overcome, so that at present the service was considered good. It was roughly estimated that the cost of horse service per day, including all items, was about $10, and while the commercial car would necessarily run a bit higher, so much more could be done that the cost was actually lower by reason of increased efficiency. Repairs were said to be slight. The company has the usual machine equipment and is well fixed as to caring for the cars, so they claim. It was stated that the cars have done so well that an increase in the equipment is to be made in the near future. It was especially pointed out that on long-distance work the cars were superior to other direct methods.

Pabst Installs Pierce-Arrow

Two Pierce-Arrow five-ton worm-driven commercial cars have been installed in service by the Pabst Brewery at Milwaukee, Wis., one of which is used by the Kansas City branch. The accompanying illustration is that of the car used at the Milwaukee plant and shows the vehicle with a fair-sized load of empties. This car is used chiefly for long hauls, for which purpose it is far superior to horse service. On several of these long-distance runs the car has worked very satisfactorily, many of the roads encountered being deep sand.

There is a peculiar feature about the Pabst service, and that is the proximity of the plant to shipping freight stations. The Pabst brewery does a big export business, and about the only way in which commercial cars can be advantageously employed, according to the company, is for long-distance work. The haul from the brewery to the freight station is but five blocks. It is said that a horse-drawn team can do the work just about as fast as a commercial car, which is readily understood, but for long distances the truck is in a class by itself. Because of the closeness of the brewery to the shipping center and the other peculiar features of the service the concern has never figured conspicuously as users of cars. Its experience dates back ten years, at which time the subject was thoroughly considered from every angle. A few cars have in the interim been found sufficient to meet the demands of the service. That the concern thinks well of trucks is well exemplified in the purchase of the two worm-driven cars now in service.

COMMERCIAL CARS GET LITTLE SYMPATHY FROM OWNERS

Commercial cars get no sympathy from their owners. Because they are machines, too often they are "cracked through" as long as they will stand the strain and blamed during the remaining period of their existence. Because they do not balk or lie down, do not lose flesh or show wear and tear for some time after deterioration begins, owners who are reasonable in every other department of their business, overload them 50 per cent., drive them at excessive speeds and make no provision for their proper inspection, cleaning and oiling. Steel literally "wears out" and rubber tires crumble long before their time under shocks and loads for which they were not designed. For unreasonable extra speed and persistent overloading, the price is always paid in repairs, many new tires and the shortened life of the machine.

The Commercial Car and the Brewery Trades in Europe

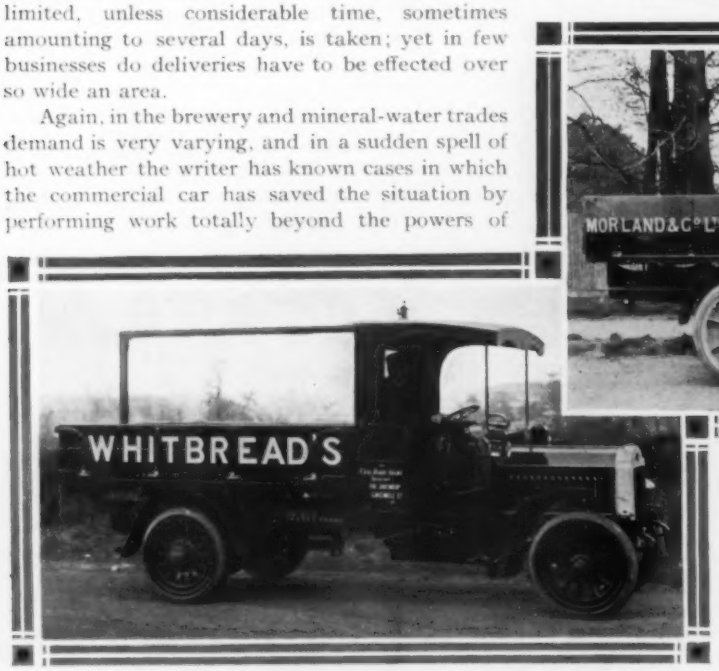
Why the Brewery Trade Has Made Headway

BY OUR FOREIGN CORRESPONDENT

THERE are few, if any, trades in Europe that have made a more extensive use of the motor vehicle for their business than has the brewery industry, especially in France, Germany and Great Britain. There are many reasons for this.

The heavy loads inevitable in the brewery business, call for powerful and correspondingly slow horses; consequently, the range of horse delivery is very limited, unless considerable time, sometimes amounting to several days, is taken; yet in few businesses do deliveries have to be effected over so wide an area.

Again, in the brewery and mineral-water trades demand is very varying, and in a sudden spell of hot weather the writer has known cases in which the commercial car has saved the situation by performing work totally beyond the powers of the firm's horses. Beyond this, the advantages of a powerful motor vehicle with a big weight-carrying capacity, and capable of maintaining a steady average of ten miles an hour, hour after hour, does not need dissertation; it is too obvious.



The celebrated British brewing firm of Whitbread's employ, among others, this well-designed Dennis low-sided wagon

Apart from all these advantages of the motor, it must be remembered that draymen are not too careful as a class. They water their horses when hot, and do many silly things that lead to disease among their horses. With the self-propelled vehicle, however, things are different, provided a few efficient men are engaged to look after the vehicles properly. It need give no trouble on the road, so long as it is laid off during a week or two for a thorough overhauling every year.

The direct delivery of the commercial car, generally speaking, offers enormous advantages, within reasonable distances, over the railways. Brewers know only too well how frequently complaints of leakages reach them on railway-borne orders, either from tapping or damage to the cask in transshipment. Neither is the quality of the beer improved by the process.

A Car Built by the Well-known Engineering Firm of Thornycroft, for some brewers in Berkshire, England

Actual Experiences

As an indication of the possibilities of the automobile for brewers' work, I cannot do better than give some accounts that came to me from Messrs. Lucas & Company, Ltd., a large brewery firm at Leamington, in England, although they were made some considerable time ago. In fact, it is this very feature of age that raises several interesting points in present-day costs. I give them as they stand for the first two years, and in giving the equivalent dollar value, have for practical purposes taken the American

dollar as equaling one-fifth of a British sovereign. This will explain the slight, but immaterial, discrepancies between the total turned into dollars and the sum of all items in dollars when added together.

For convenience I have divided these accounts under the two headings of "standing" and "running" charges, the former being those which would occur whether the truck was used or not, while the running charges are purely incidental to the actual working of the vehicle.

Costs of Running Three-Ton Gasoline Truck—First Year

STANDING CHARGES	£	s.	d.		$
Interest @ 5% on cost of wagon (£750 or $3750)	37	10	0	or	187.50
Depreciation @ 20%	150	0	0	or	750.
Total					937.50
RUNNING CHARGES	£	s.	d.		$
Wages (two men, including overtime)	121	19	0	or	609.
Fuel	55	18	2	or	279.52
Lubrication and cleaning waste	26	7	5	or	131.82
Fittings and repairs	31	9	7	or	157.38
Sundries	6	5	9	or	31.42
Total					1209.14
Grand total					2146.64
Distance run					8020 miles

Costs of Running Three-Ton Gasoline Truck—Second Year

STANDING CHARGES	£	s.	d.		$
Interest @ 5% on cost of wagon (£750 or $3750)	37	10	0	or	187.50
Depreciation @ 20%	150	0	0	or	750.
Total	187	10	0	or	937.50
RUNNING CHARGES	£	s.	d.		$
Wages (two men, including overtime)	132	11	3	or	662.78
Fuel	78	0	7	or	390.07
Lubrication and cleaning waste	22	14	7	or	110.62
Fittings and repairs	31	9	7	or	157.38
Sundries	1	1	0	or	5.24
Total	265	17	0	or	1326.09
Grand total	453	7	0	or	2263.59
Distance run					9100 miles

An Analysis of Costs—Interest and Depreciation

I have not run the costs per car mile or per ton mile out, as I venture to think that they would be misleading. In the first place, in my opinion interest and depreciation are charged too high; while insurance, rent, rates, taxes, tires (the truck ran on rubber tires), management and licenses are not included

Let us examine these figures item by item.

Interest and depreciation are so rolled up, the one with the other, that we will take depreciation first. Depreciation, as I understand it, is a sum of money written off the

The Maudslay Truck; used by Messrs. Lucas, of Leamington, which is doing splendid work. This car is wonderfully quiet, and economical on gasoline

value of the vehicle year by year as its age increases and its value decreases as an asset. It is hardly practicable to show depreciation absolutely accurately year by year, for as soon as the vehicle has been in use for a month it becomes secondhand and its value comes down with a slump. The actual wear and tear of the first year's work do not do much damage. In the second year's work the machine loses rather more of its value, in the third year more still, and so on.

Thus, accurately speaking, within a month from the purchase of the vehicle its value should be written down by about one-third, and then year by year in steadily varying amounts. In practice, however, the most we can do is to write off a more or less fixed percentage year by year.

The Ryknield Five-Ton Truck and Trailer; which has done some wonderful work as chronicled in this article

Even then we are faced with a difficulty. If we have a car worth $1000 and depreciate it at the rate of 20% a year, at the beginning of its second year its value will stand at $800, and for the next year you have only this sum of $800 to depreciate at the rate of 20%. It is, in fact, a compound process, and 20% year by year on a regularly lessening value is quite a different thing from an annual charge of 20% on the first cost, as is given in these accounts. Charging a 20% depreciation on the cost of the truck, as they do in the above accounts, would lead to its cost being written off long before the machine was anywhere near past work, but it must be remembered that when these accounts were drawn up (some four years ago) the depreciation of heavy cars like three-tonners was more or less an unknown quantity. As far as we have yet gone, experience has shown that such machines ought to last at least seven years before their value depreciates to below 10% of the original cost, which may be regarded as a fair scrap price. Assuming, therefore, a seven-year life, and regarding the value of the vehicle upon which depreciation is charged annually as a wasting security,—that is, annually writing off only on what is left over and above from the depreciation of the previous year,—we find that during the seven years of this life the depreciation will average 13.179% of the cost price of the car. This, I think, readers will find the handiest way of managing depreciation.

As with depreciation, so with interest. As a certain sum of money is sunk in the purchase of a car, and as that sum is written off each year by depreciation, the money that writes off that depreciation is available for interest, and therefore only the depreciated value of the car year by year can fairly be taxed with interest. Worked out on a seven-year basis, the interest would amount to an average of 2.175% annually, if the owner is to take the equivalent of 5% on the annually dwindling value.

Taking these figures, it will be seen that those in the account are far from giving fair actual values.

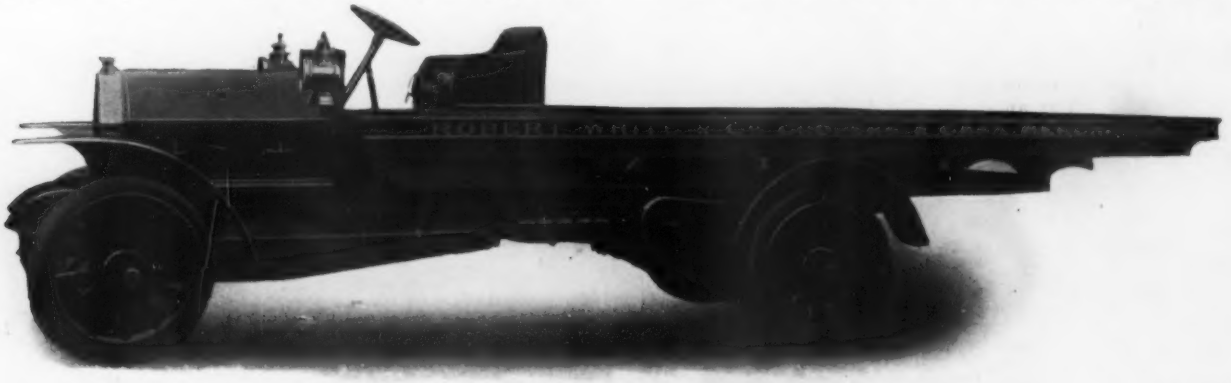
Setting Out on the Morning Round. Three De Dion wagons in the service of Pommery, the champagne firm

On the other hand, the standing charges do not include insurance or any rent, rates or taxes. In Europe about £12 (or $60) would be a fair amount for insurance, while a charge of £6 (or $30) ought to be ample to cover the other items. Taking the lower values for interest and depreciation, and including insurance, rent, etc., we are still some £57 10 0 ($287.50) to the good, on the standing costs given by Messrs. Lucas.

The Running Charges

Turning now to the running charges, a fair wage for a driver is 30s. to 35s. ($7.50–$8.75) a week (as the cost of living on this side of the Atlantic is much lower than in the Western Hemisphere). Those of an assistant, 20s. to 26s. ($5–$6.50) a week. Taking 32s. (or $8) a week as a fair wage for the driver and 25s. (or $6.25) a week for the assistant, we get an annual wage bill of £148 4 0 a year without overtime, so that the Leamington wages bill may be regarded as remarkably low.

The item for fuel might be open to question until it is explained that gasoline was used and that the price per gallon when these costs were made was higher than at present, but that the tax of 1½d. (3 cents) per gallon that has since been placed on all gasoline for industrial work—for private cars, which is 3d., or six cents—brings the final fuel cost much about the same. It must also be pointed

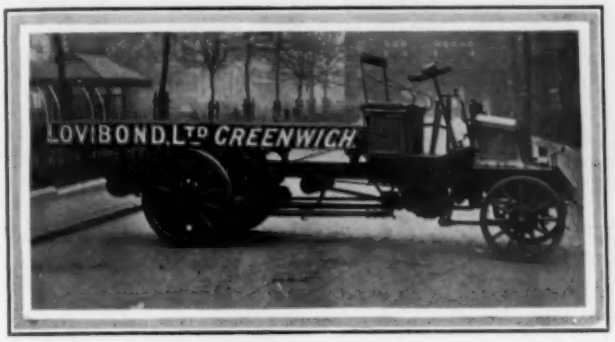


The trades subsidiary to the brewing industry also employ motor trucks extensively. The above is a Two-Ton Bellhaven, built for a firm of Coopers. Note the manner in which the platform is brought flush with the driver's seat, and the neat way in which the mechanism is enclosed

out that the vehicles used were exceptionally economical. All the other items would come to much about the same to-day as they did then, but an important point has been omitted. The charge for tires was probably about 2d. per mile, for the roads were average English roads; but, nowadays, the figure will probably run to 1¾d. per mile as an outside safe-side estimate.

Comparative Cost of Horse Working

Now let us see how these results compare with the results that the same firm was previously obtaining from horses. The firm reckons that one commercial car can do



One of the Oldest Existing Motor-Driven Vehicles Employed in the Brewery Industry; a Daimler car, built in Germany

the work of six horses, and then return by three or four o'clock in the afternoon and be available for short trips if required. Still we will only take the six horses as a basis of comparison. Here are Messrs. Lucas' figures for working six of their horses.

Cost of Working Six Horses and Two Drays—The Equivalent of One Gasoline Truck

STANDING CHARGES	£	s.	d.		$
Interest @ 5% on total outfit (£486 or $2430)	24	0	0	or	120.
Depreciation on horses (£330 or $1650) @ 15%	49	10	0	or	247.50
Depreciation on drays (£96 or $480) @ 10%	9	12	0	or	48.
Depreciation on harness (£60 or $300) @ 5%	3	0	0	or	15.
Total	86	2	0	or	430.50
RUNNING CHARGES	£	s.	d.		$
Wages (two men and assistants unloading)	135	4	0	or	676.
Feed and stable expenses @ 15s. ($3.75) per horse	234	0	0	or	1170.
Shoeing @ £4 (or $20) per horse	24	0	0	or	120.
Vet's fees @ £1.1s. ($5.25) per horse	6	6	0	or	31.50
Repairs to drays and harness	10	0	0	or	50.
Allowance for empties collected	35	4	0	or	176.
Total	444	14	0	or	2223.50
Grand total	530	16	0	or	2654.

A good example of a smaller type of truck for brewers' work is afforded by an 18 h.p. Daimler vehicle employed by William Hancock & Company, Ltd., of the Brewery, Cardiff.

Here are some figures that will give a good idea of actual costs, together with the costs of each item per mile.

18 H. P. "Milnes-Daimler" Petrol Lorry

DETAILS OF FUEL AND SUPPLIES			£	s.	d.		$
Petrol	116 gals.	@ 1.0d. gal.	5	16	0	or	28.25
Cylinder oil	¾ gals.	@ 1.5d. gal.		1	0½	or	.26
Engine oil	7½ gals.	@ 2.7d. gal.		19	4½	or	4.84
Paraffin	3 gals.	@ 0.8d. gal.		2	0	or	.50
Waste	13 lbs.	@ 22.0d. cwt.		2	5½	or	.61
Anti-corrosive paste	21 lbs.	@ 27.0d. cwt.		5	3¼	or	1.315
Blacklead	1 tab.	@ 1.6d. doz.			1	or	.02
Metal polish	6 tins	@ 0.7½d. doz			3¾	or	.075
			7	6	6¼	or	36.635

RUNNING COST PER MILE

Insurance per mile	.7d.	or	$ .14
Fuel	2.1d.	or	.052
Drivers' wages	2.8d.	or	.066
Repairs	.6d.	or	.012
Supplies other than fuel	.5d.	or	.010
Interest in first instance (5%)	1.0d.	or	.025
Depreciation (@ 15%)	3.0d.	or	.060
	10.7d.	or	.214
Total running cost per mile	10.7d.	or	.214
Number of miles run	661		
Miles per gallon of petrol	5.6		

It must be pointed out, however, that gasoline in quantity can now be obtained at about 8d. per gallon, a difference sufficient to bring the running costs down to 10d. (twenty cents) per mile. The figures in dollars and cents are only, of course, approximate, but they serve to convey a more definite idea to the mind.

Some Costs of Brewery Work With Trailers

Probably the best authenticated and most useful results known concerning the use of motor trucks with trailers were obtained in August and September of 1908 by the famous firm of Bass, Ratcliffe & Gretton, of the Burton Brewery, whose products are known the world over. Messrs. Bass wanted to see what this form of traction could do against the railway company, and having to run a regular load daily from Burton to Birmingham, they put a five-ton Ryknield truck at work with a trailer on this route. On the outward journey the truck took 5½ tons of useful load on its own platform, and three tons on the trailer—8½ tons in all; but since the return load (made up of empties) only came to 1½ tons, the average load works out to 5 tons for the out and return journey of sixty miles.

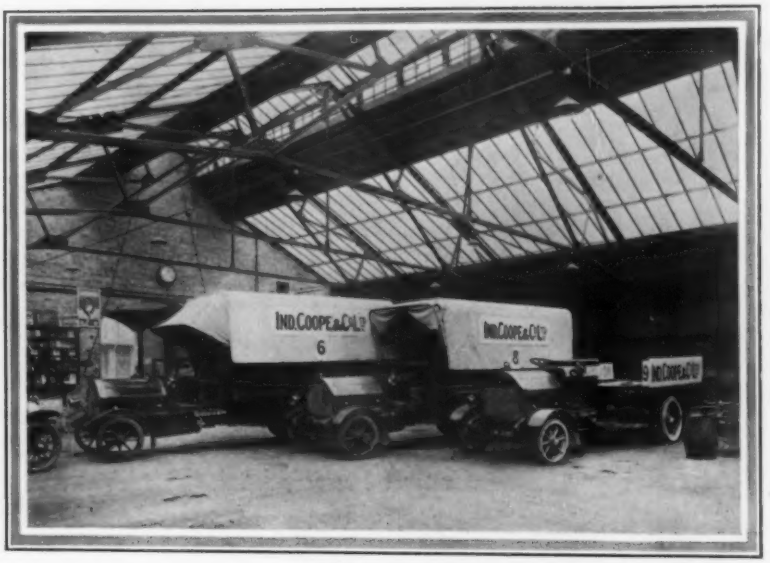
Below is given a summary of expenses of the truck just as compiled by Messrs. Bass, except that it is in American money. Examining these costs we see that a journey was missed during the first and third week.

Summary of Expenses of Brewery Truck and Trailer

FOR WEEK ENDING	AUG. 5	AUG. 12	AUG. 19	AUG. 26	SEPT. 2
Driver	$ 8.75	$ 8.75	$ 8.75	$ 8.75	$ 8.75
Washing	1.	1.	1.	1.	1.
Garage	1.25	1.25	1.25	1.25	1.25
Oil	2.50	3.25	2.	2.	2.62
Petrol	11.45	13.75	9.87	11.87	13.25
Grease	. .	.75	1.31	. .	1.31
Waste	. .	.75	. .	1.50	.25
Material and spare parts	. .	. .	4.29	.43	1.37
Extra labor	. .	. .	.84	. .	. .
Depreciation @ 15%	10.76	10.76	10.76	10.76	10.76
Interest on first cost @ 4½%	3.72	3.72	3.72	3.72	3.72
Insurance	1.37	1.37	1 37	1.37	1.37
Tires @ ¾d. a mile	3.75	4.68	3.75	4.68	4.68
Total	$44.60	$50.08	$49.00	$47.39	$50.39
Total including trailer	$54 89	$61.31	$59.29	$58.62	$61.62
Car miles run	240	300	240	300	300
Ton miles run	1242.6	1455	1347	1586	1576
Aver. load in tons	5.17	4.85	5.61	5.286	5.255
Aver. fuel consumption in m.p.g.	4.8	5	5	5	4.84
Cost per ton mile in cents	4.24	4.04	4.22	3.54	3.76

There is only one point to which we can take exception in these accounts, and that is the absence of any allowance for rent of shed, accommodation, etc., but this is not a charge sufficient to appreciably influence the results.

No one can say that the assessment of depreciation at 15% is excessive, seeing that it was carrying a very heavy load and hauling trailer as well. Still it is probably not too low if reckoned on a compound basis, but interest on such a basis is undoubtedly a good 2½% too high.

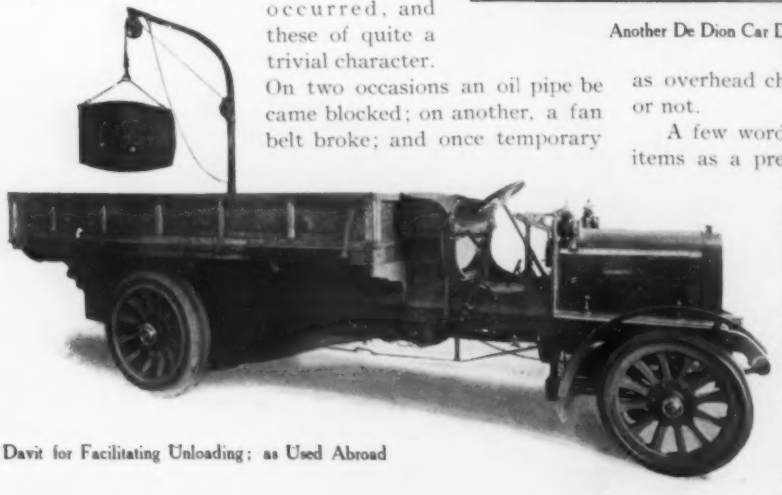


In Garage. Three Big Swiss-Built Berna Vehicles; used by an important British firm of brewers

The average fuel consumption on these figures comes out to almost exactly five miles per gallon, and it is doubtful whether, even with modern carburetors, the average truck could get much better consumption results with such loads and trailer work.

The tire charges are rather interesting, for the motor truck itself was only fitted with rubber tires to the front wheels, broad steel tires being provided on the back wheels to take the drive. The trailer has rubber tires throughout and the cost for the whole set thereon worked out to about ¾d. per mile, the front pair of tires on the truck costing practically the same. The trailer tire figures appear particularly low, and, as a matter of fact, enjoyed a life of about twenty thousand miles, which must be set down to the fact that they are not subject to any driving stresses.

The driver's reports show that during the whole five weeks given in the summary only three delays from mechanical causes occurred, and these of quite a trivial character. On two occasions an oil pipe became blocked; on another, a fan belt broke; and once temporary difficulty was experienced with the trailer on a sharp gradient; but all other delays were due to stops occasioned by meeting restive and inadequately trained horses.

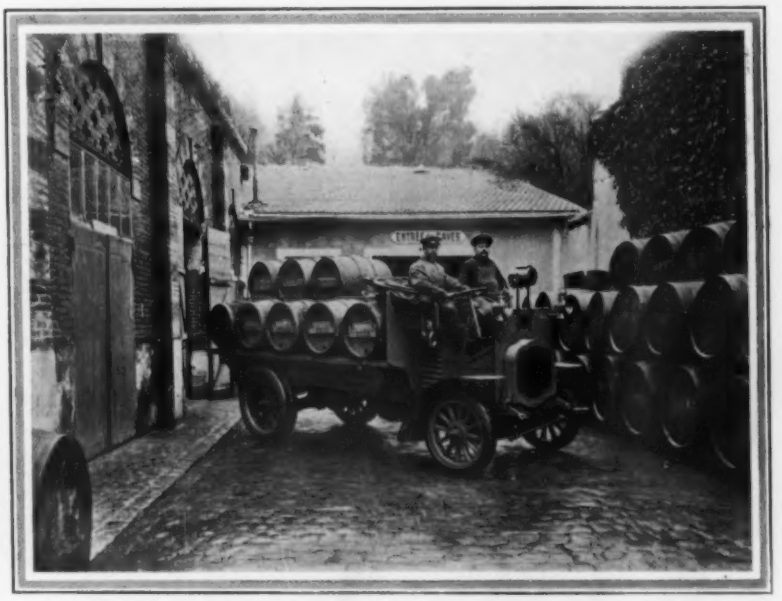


Davit for Facilitating Unloading; as Used Abroad

Some Scientific Costs Based on Experience

I have purposely taken older costs, because, while with explanations they give an accurate indication of the possibilities of the commercial truck for brewers, the explanations themselves are useful in emphasizing how certain items may vary from time to time.

With knowledge so given from actual experience, we may now go on to summarize the experience of past years in a series of costs, and in running out these figures I have given two sets in each case. One set is based on a low annual mileage, the other on a fairly high mileage; this, too, indicates the importance of getting all the mileage possible within a given time,



Another De Dion Car Doing Good Work for a French Brewery

as overhead charges go on whether the machine is running or not.

A few words are, however, necessary on several of the items as a preface. Interest and depreciation are taken annually on the steadily dwindling value of the vehicle, and an average of all the years of the assumed life is struck, on the lines previously suggested in this article.

Management is charged at 5% on the total expenses, and though, of course, the system of paying on percentage of expenses is absolutely pernicious, it serves quite well for purposes of estimating.

As regards lubrication, a consumption of a gallon to three hundred miles is, roughly speaking, assumed, but it

should be pointed out that with modern systems, by which the oil is constantly circulated and used over and over again after filtering, five hundred miles to the gallon ought to be obtainable.

Here are the costs for the three-tonners:

Estimate of Average Costs of Running Three-Ton Gasoline-Driven Brewers' Truck Ten Thousand Miles a Year

STANDING CHARGES	£	s.	d.		$
Interest @ 2.175% (seven years life basis) on cost (£550 or $2750)	11	19	3	or	59.81
Depreciation @ 13.179% (seven years life basis) on cost (£550 or $2750)	72	9	8	or	362.41
Insurance	11	0	0	or	55.
Rent, rates and taxes	7	0	0	or	35.
Total	102	8	11	or	512.22
RUNNING CHARGES	£	s.	d.		$
Management @ 5% on total working expenses	21	9	7	or	107.39
Wages, driver @ 35s. ($8.75) per week	96	0	0	or	480.
Stillager @ 22s. ($5.50) per week	57	4	0	or	276.
Fuel @ 6½ miles per gallon and gasoline @ 8d. (16 cents) per gallon	51	5	4	or	256.33
Tires @ 1¾d. (3½ cents) per mile	72	18	4	or	364.58
Lubrication @ £1 per 100 miles	5	0	0	or	25.
Stores	2	0	0	or	10.
Repairs and maint'nce @ 7½% per annum	41	5	0	or	206.25
Licenses	1	10	0	or	7.50
Total	348	12	3	or	1743.06
Grand total	451	1	2	or	2255.29

This gives a cost per car mile of 10.825d., or 21.650 cents, and if the load only averaged one ton, the ton mileage cost would be the same. If the load averages two tons the cost per ton mile is 5.413d. (10.825 cents), if a full load 3.608d. (7.217 cents). As a fair average of working conditions 5d., or 10 cents, may be taken as a reasonable figure.

Estimate of Average Costs of Running Three-Ton Gasoline-Driven Brewers' Truck Sixteen Thousand Miles a Year

STANDING CHARGES	£	s.	d.		$
Interest @ 2.2% (six years life basis) on cost (£550 or $2750)	12	2	0	or	60.50
Depreciation @ 15.408% (six years life basis) on cost (£550 or $2750)	84	14	11	or	423.72
Insurance	11	0	0	or	55.
Rent, rates and taxes	7	0	0	or	35.
Total	114	16	11	or	574.22
RUNNING CHARGES	£	s.	d.		$
Management @ 5% on total working expenses	26	14	3	or	133.56
Wages, driver @ 35s. ($8.75) per week	96	0	0	or	480.
Stillager @ 22s. ($5.50) per week	57	4	0	or	276.
Fuel @ 6.5 miles per gallon and gasoline @ 8d. (16 cents) per gallon	82	1	4	or	410.33
Tires @ 1¾d. (3½ cents) per mile	116	13	4	or	583.33
Lubrication @ £1 per 100 miles	8	0	0	or	40.
Stores	3	0	0	or	15.
Repairs and maint'nce @ 10% per annum	55	0	0	or	275.
Licenses	1	10	0	or	7.50
Total	446	2	11	or	2230.72
Grand total	560	19	10	or	2804.95

Cost per mile 8.415d. (16.830 cents), per ton mile 4.207d. (8.415 cents) with load average of two tons, or 2.805 d.(5.610 cents) with full load all the way. About 5½ cents may therefore be taken as a fair figure under usual working conditions.

Longer Life for Trailer

So much for the three-ton truck costs. Turning now to the five-ton truck with trailer accounts, it will be noticed that in both sets, of course, a much longer life has been assumed for the trailer, because it is subjected to no driving stresses. This is the outcome of the experience hitherto.

Depreciation on the truck when drawing a trailer is naturally higher, owing to increased wear and tear. So are fuel, lubrication, stores and repairs for the same reason, but it will be noticed that there is no charge for tires, as steel tires have been assumed, and these are included under the heading of repairs and maintenance.

The 18 h.p. Daimler Truck, Used in the Service of William Hancock & Co., Brewers, of Cardiff. Costs of working this vehicle are given in this article.

Provided the authorities will stand the extra noise, I do not think that with a trailer—hauling vehicle where the speeds are naturally lower,—it is a profitable proposition to run on rubber tires.

Estimate of Average Costs of Running Five-Ton Gasoline-Driven Brewers' Truck, With Trailer, Twelve Thousand Miles a Year

STANDING CHARGES	£	s.	d.		$
Interest @ 2.054% on trailer (nine years life basis) on cost (£150 or $750)	3	1	7	or	15.39
Interest @ 2.305% on truck (five years life basis) on cost (£600 or $3000)	13	16	7	or	69.14
Depreciation @ 10.025% on trailer (nine years life basis) on cost (£150 or $750)	15	0	9	or	75.18
Depreciation @ 18.446% on truck (five years life basis) on cost (£600 or $3000)	110	13	6	or	553.37
Insurance	13	0	0	or	65.
Rent, rates and taxes	8	0	0	or	40.
Total	163	12	5	or	818.08
RUNNING CHARGES	£	s.	d.		$
Management @ 5% on total working expenses	24	13	4	or	123.33
Wages, driver @ 35s. ($7) per week	96	0	0	or	480.
Wages, stillager @ 22s. ($5.50) per week	57	4	0	or	286.
Fuel @ five miles per gallon and gasoline @ 8d. (16 cents) per gallon	80	0	0	or	400.
Lubrication @ 1s. 6d. (36 cents) per 100 m.	9	0	0	or	45.
Stores	3	10	0	or	17.10
Repairs and maintenance of truck @ 12½% per annum	75	0	0	or	375.
Repairs and maintenance of trailer @ 5% per annum	7	10	0	or	37.50
Licenses	1	10	0	or	7.50
Total	354	7	4	or	1771.83
Grand total, without tires	517	19	9	or	2589.91

This gives a cost of only 10.360d. (21.720 cents) per car mile, a figure that emphasizes the possibilities of the trailer to a remarkable degree. It must be borne in mind, however, that a mileage of 12,000 per annum is quite exceptional for this class of vehicle with trailer, still the fact that it can be and has been done fully justifies our costs under favorable conditions on such a mileage basis.

These costs then work out as follows: With eight-ton load, average all the way 1.295d. or 2.590 cents per ton mile; with seven tons average load, 1.480d. (2.960 cents); six tons average, 1.727d. (3.454 cents); five tons, 2.072d. or 4.144 cents; four tons, 2.590d. or 5.180 cents; and three tons average load, 3.453d. or 6.906 cents. In both these wagon-with-trailer costs about five tons may be taken as the fair average load under ordinary conditions.

Leading British Trucks—The Leyland

BY FRANK PALMER

THE chasses produced by the Leyland Company are almost unique in respect to the factory arrangements, by reason of the turning out, side by side, of heavy steam trucks and heavy gasoline trucks. Formed originally with the sole object of building heavy steamers in 1896, gasoline types of chassis were designed by this firm in 1904, and the major portion of the business now comes from the latter. They have been extremely successful for heavy load trucks, carrying from three tons upward, in addition to producing a special chassis for London omnibus work. As some indication of quality of material and workmanship put into the various vehicles, it can be stated that one London municipality—the Borough of Chelsea—owns fifteen heavy steam wagons, capable of carrying five tons and hauling simultaneously a two-ton trailer, two of these machines having been working continuously since 1900, one since 1903, two since 1905, and ten since 1906. Except for very rare repairs, all these steam trucks have done five full days' work every week each year, at a cost for repairs and renewals of two hundred dollars per vehicle per annum for the older machines and somewhat less for the newer.

Leyland Luggage Van Recently Supplied to King George V, of England. This is the first commercial vehicle used by any member of the British royal family

Gasoline Worm-Driven Omnibuses

For the gasoline chassis, two types are constructed, for loads up to two and one-half tons in four sizes, and having a worm driven live axle. For loads from two and one-half tons to six tons a live axle is also employed, but the transmission is through bevel gears, as explained in the following description. The worm-driven type has proved its reliability for the hardest possible strains imposed on commercial chasses, in the shape of London omnibuses, thirty-one of which are owned by a small operating company. The manufacturers have a repair contract with this company, by which they guarantee to keep the vehicles in perfect running order for a fixed price per mile and, on account of the stringent conditions imposed by the police, who are the licensing authorities, this means a very high standard of reliability, if the contract is to be a paying one. Further, the police require every vehicle to be completely dismantled and overhauled every twelve months, yet despite these difficulties, the operating company has never covered less than ninety-eight per cent. of its scheduled mileage per week, and quite recently achieved the record of ninety-nine and one-half per cent. In other words, these omnibus chasses perform so efficiently that it is an unusual occurrence for one to be laid up for repairs other than those due to the usual street accidents. One omnibus is always kept in reserve and one is always undergoing the annual overhauling (occupying fourteen days). The other twenty-nine run seven days a week, each averaging from thirty-eight to forty thousand miles per annum over some of the worst paved routes between the northwest and southeast of London.

But good as is the omnibus record, it is exceeded by less showy work that does not come much under public notice, because it is undertaken entirely during night hours. This is the carrying of parcels post mails for the Government, and the Leyland Company is itself directly operating eighteen machines for various services radiating from London, all of which have to be completed strictly to schedule, dead to the minute, at speed throughout of twelve miles per hour, irrespective of hills and condition of roads. Each of these services starts from London about 10 p.m., and a corresponding machine starts from the other end at the same time, where the distances are too great to permit the return journey being made the same night. The longest trip is to Portsmouth, seventy-two miles, and only one of the eighteen machines, it is claimed, has lost any time for eighteen months, and then the twenty minutes delay was due to a burned-out armature in the high tension magneto. The loads on these parcels mail vans hardly ever exceed one and one-half tons, but the difficulty of keeping to a fixed time, down to the minute, and never arriving early or late at any of the several post offices en route in seventy-two miles, can only be understood by those who have endeavored to perform similar duties.

Technical Details

Three sizes of engine are built, four-cylinder, 24-30 h. p., four-cylinder, 40 h. p., and six-cylinder, 50 h. p., all having the same stroke, 130 mm. (5.12 in.) with respective bore of 114 mm. (4.49 in.), 120 mm. (4.73 in.) and 114 mm. Cylinders are cast in pairs, with valves on one side actuated from

a single cam shaft. The valve tappet rods carry hardened steel lifting rollers at their bases and adjustable heads, and are also fitted with follower springs to keep them constantly in contact with the valve stems throughout the cycle of operations. The tappets move in phosphor-bronze bushes, each pair held down by a single dog and nut that screws on to a fixed stud. The valve stems, etc., are competely enclosed by aluminum cover plates, the plates being retained by swing handles to ensure quick detachment. The crankshaft is machined all over, produced from vanadium-steel alloy, and is supported from the upper half of the crank chamber in three very long white-metal bearings for the four-cylinder models, and five bearings for the six-cylinder models.

Combination Oiling System

Lubrication is partially pressure fed, a skew gear near the tail end of the camshaft driving an unusually large spur gear oil pump situated on the exterior of, and in line with, the camshaft. For cleaning purposes it is only necessary to undo a couple of nuts and two unions, when the pump can be at once lifted clear from the engine. A drainage sump, guarded by a large detachable gage filter, is formed at the rear of the lower portion of the crank chamber, whence the oil pump draws its supply and delivers to a tank placed high up on the dashboard, the delivery pipe at this end being covered by a loosely fitting cap and long rod, the latter projecting through the top of the oil tank. Each pulsation of the pump lifts a loose cover, and so raises the rod about half an inch, the apparatus being visible by kerosene lamp at night, thus giving to the driver constant indication that the pump is working properly. From the dashboard tank, pipes are taken to each crankshaft bearing, giving a head of about eighteen in., which is amply sufficient pressure under all circumstances. From each main bearing, oil ways are drilled longitudinally through the crankshaft to reach the crank pin bearings of the connecting rods, and enough lubricant exudes therefrom to be thrown on to the cylinder walls and up to the gudgeon pin bearings of the H type connecting rods.

The cutting down of weight is not so essential on a commercial vehicle as it is on a pleasure car, consequently the Leyland cylinder cooling water jackets are extremely large, and on the valve side project to such an extent around the ports as to give the impression of extra cylinders being attached. The water circulating centrifugal pump is situated between cylinders and raditor, and in order to accommodate a throttle governor, the drive to the pump is taken from the timing gear for the camshaft, through a skew gear to a short vertical shaft, which, in turn, drives a second skew gear to a horizontal cross shaft that serves both the water pump at one end, and the high tension magneto at the other end. The outlet from the pump enters directly below the exhaust valve chests, and the cylinder outlets to the radiator are led from between the valve chests and the tops of the cylinder jackets.

Special Radiator

The radiator is composed of separate vertical copper tubes, each having an internal diameter of one-half in., with external copper gills, the tubes extending from just in front of the axle nearly to the top of the bonnet, where they run into an aluminum header tank having vertically cast flanges in line with the direction of the vehicle. The tubes are separately retained, top and bottom, by thick rubber blocks that cushion each tube from vibration, and further serve for instant detachment and replacement of any tube in case of accident. This radiator design has only been evolved after long experience with all sorts of devices, and, owing to the considerable quantity of liquid carried and large amount of exposed surface, overheating troubles never occur; nor is it necessary to go to the expense of a complete new radiator, even though the majority of the tubes should happen to be smashed in a collision. A four-bladed, cast aluminum fan, flat belt driven from the protruding end of the crankshaft, keeps the water cool when the vehicle is standing or ascending very long grades on bottom gear; the carrier of the fanshaft is mounted in an eccentric bracket, with lock nut for taking up stretch in the driving belt.

Leyland Five-Ton Truck; standard type pressed-steel disc rear wheels

Compression relief taps are situated centrally for each cylinder, the spark plugs are countersunk into the hexagon valve chest caps, and water drainage taps are placed at the lowest points at the cylinder jackets. At the side of the crank chamber, opposite the valves, inspection doors are fitted, these being sufficiently large to conveniently withdraw the connecting rods and pistons without removing the engine from the chassis.

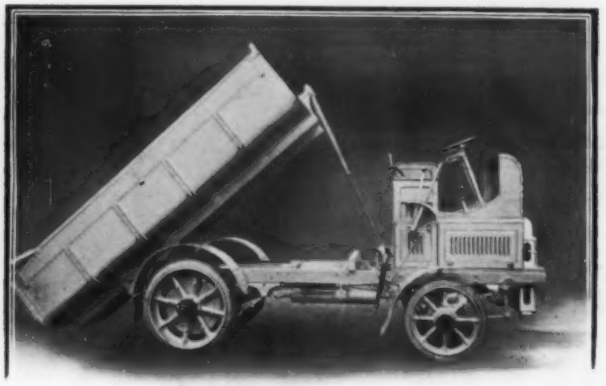
Original Engine Mounting

The mounting of the engine in the frame deserves special mention, as the method employed is distinctly original. At the front and rear of the engine, circular spaces are provided in the crank chamber castings, through which accurately fitting and large diameter weldless steel tubes are carried. These tubes are long enough to just reach the side members of the chassis framing, where brackets are bolted, in which the tube ends rest. The ends are threaded externally and carry nuts and lock nuts, so that when the brackets are bolted home, the tube nuts are jammed against the

brackets, and thus hold everything securely. For alignment purposes, collars with set screws are made a sliding fit over the tubes and are brought up against each side of the crank chamber; consequently it is only a matter of a very few minutes to accurately determine the proper position of the engine when assembling at the factory or at any other time. Whilst assembling is well attained, the main object of this arrangement is to obviate breakage of the usual aluminum bearer arms and incidentally give much stiffer support, without any possibility of twist on the bearings.

Light Weight

The same device of very large diameter steel tubes forms the scheme of the several cross-frame members, supports for the gear box, etc., the only exception coming at the extreme rear of the frame where a regular pattern of pressed steel strut with gusset plates, is fitted. The pressed steel side



Leyland Tip Wagon Body Lifted by Screw; the driver is placed above engine to reduce length of wheel base

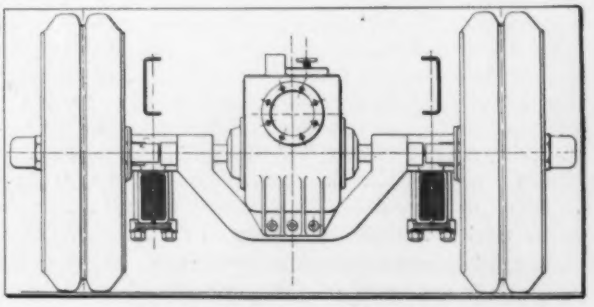
members are thinner and considerably lighter than similar commercial chasses the writer has inspected, these portions being manufactured of nickel steel, somewhat costly for commercial work, yet highly satisfactory in combining strength with extreme lightness. The actual weight, not estimated, of an omnibus chassis for carrying thirty-six passengers, with 24 h. p. engine, cast steel wheels 36 in. rear with twin solid rubber tires and front wheels 32 in. with single tires, comes out at the marvelously low figure of 5150 lbs. The complete vehicle with double decked body, ready for running on the road never exceeds 7800 lbs. or a few lbs. under 3½ English tons. This paring down of weight is a new feature for British commercial trucks, brought about by reason of the police licensing authority in London now refusing to permit any new omnibuses over 3½ tons to ply for hire. The majority of the 1200 omnibuses of similar power and same load capacity run up to 5 tons and 5¼ tons, and although the police demands were considered impossible, here is proof that what they require is quite feasible. It will mean less running cost for gasoline and oil, much smaller annual maintenance for the most expensive item, viz., rubber tires, and as shown by those chasses already in use, has more than halved the annual bill for repairs.

The transmission system comprises 26 in. diameter metal to metal cone clutch, universal joints at each end of the clutch shaft, four-speed gear box of selective type with shafts carried in ball bearings, a short length of transmission shafting beyond the gear box with a metal enclosed universal joint at each end, and then the propeller shaft proper, which is enclosed in a casing attached to the rear axle casing. As regards the final drive, two types are supplied, worm drive up to 2½ tons load capacity and bevel drive for loads beyond that weight. For the worm-drive transmission the propeller shaft is dead horizontal with full load aboard, the worm being on top of the worm wheel and relieved from strains by a patented thrust block ball bearing, mounted at the forward end of the propeller shaft casing. This thrust block is itself supported from a cross tube frame member, exactly in line with the brackets to which are attached the forward ends of the rear half-elliptic springs. The plan view of the worm driven chassis shows how the propeller shaft casing acts partially as a torque tube, the drive being distributed pretty equally between the tube and the fore-ends of the springs. For both types of drive, the road wheels are held to the differential shafts by castellations and revolve on large diameter ball bearings around the outer ends of the axle casings. Where loads of 6 tons and over must be carried, the bevel drive type is used, but with a special form of axle in which a forged steel axle takes the whole weight. The differential box is mounted on top of the dropped axle centre and the differential shafts are taken horizontally through passages bored out of the axle. Owing to the size of the axle forging in this case the rear springs are underslung.

Reverting to the bevel drive type, it should be mentioned that the crown bevel wheel surrounding the differential is not in line with the axle shafts, but is taken forward of, and partially above, the axle casing in a box-like extension. Where the differential shafts project, spur pinions are attached that are in mesh with similar spur wheels, mounted upon the road wheel driving shafts. The makers claim that the design is stronger than normal patterns and that an axle so constructed is not liable to sag in the center.

Controls

The front stub axles are short and reversed, i. e., the pivot pin is inside the hub, directly vertical in line with the



Leyland Back Axle; used on six-ton vehicle

tread of the tire. The control arrangements consist of fixed point magneto ignition, throttle lever on steering column, the rod from latter in a tube outside the column and joined to the carburetor by a chain running over pulleys, side-gate change-gear lever, side lever for rear internal expansion hub brakes, clutch pedal, and pedal for locomotive-type brake behind the gear box. The latter brake is adjustable for wear by merely turning a spring-held handle just below the side of the frame.

The Grabowsky Commercial Cars

BY WILLIAM J. JOHNSON

ONE of the most active of the Middle Western builders of power trucks at the present time is the Grabowsky Power Wagon Company, of Detroit, Mich. To say that this concern has met with very gratifying success in the marketing of its product is but to state a fact, for the Grabowsky by the way, is a "guaranteed service" car. The sponsors of this make of truck are too well known to the trade and industry in general to require more than passing mention here. Suffice it to say that Max Grabowsky, the prime mover of the Grabowsky Power Wagon Company, first of all set out to design and build a chassis that he was certain was right and, convinced that he had attained that end, cars were built and sold and are to be seen in many of the larger cities to-day, where the owners state that they are doing good work. The Grakowsby is, therefore, of a tried-out design, and the efforts of the Grabowsky organization are devoted to the betterment of an already satisfactory unit.

Four Chasses

There are some makers of commercial cars who build but the one model from which they never deviate, and he who would have a car must take what is offered or else go to another maker who has something else to offer. If the maker of motor trucks would have the business he must have more than one model; that is, of course, if he desires to obtain business from more than one class of users. The organization behind the Grabowsky considered this point, and the result is that four chasses are offered to those who would install motor trucks. First of all, there is the standard one-ton delivery wagon with a wheel base of 102 in., which without the body retails for $2100. The standard 1½ ton truck with wheel base of 127 in. sells for $2400, without the body; the two and three-ton models are of the same wheel base and the chasses alone sell for

Fig. 1. Grabowsky Truck; as used by the Bell Telephone Company of Canada, for carrying reels of wire and tools in erecting new lines and repairing old ones. The wheels are of heavy reinforced artillery type, and have solid rubber single tires front and rear.

$2800 and $3200 respectively. However, as regards length of frame and wheel base, that is pretty much according to the desire of the purchaser, the standard measurements being as above noted.

Same Construction on all Models

If the designer and builder of a commercial car adopts a particular design and he has learned through actual service that it is right, that it meets all service demands satisfactorily, then he is justified in modifying that design for larger or smaller models by the essential increase in strengeh of the parts that go to make up the vehicle. The Grabowsky cars, of whatsoever load capacity, are identical in construction. The three-ton truck follows the same general lines in build that exist in the one-ton delivery wagon; in other words, there is a sort of standardization of Grabowsky models, one general design for all four vehicles. This system of doing things which facilitates and expedites manufacture has been found to work out very well indeed.

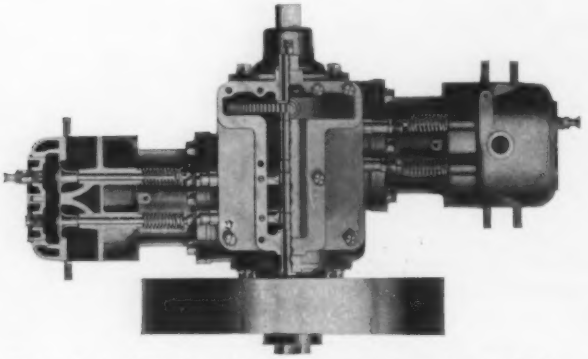


Fig. 2. Sectional Top View of Grabowsky Double Opposed Cylinder Motor; having mechanical inlet and exhaust valves

Salient Grabowsky Features

There are many unique features about the Grabowsky power wagons that tend to simplify operation. To begin with, there is a removable unit power plant which slides on the subframe and is quickly locked in place, and no tools but an ordinary wrench are required to perform the operation. The importance of quick removal of a power plant is fully appreciated by those who are successfully using motor trucks in numbers. The Grabowsky power plant can be removed and another installed in fifteen minutes.

Liberal use is made of hardened steel bushings, replacement of which entails a slight expense, these bushings being used in thirty-eight places about the chassis where renewals have to be made occasionally, *i. e.*, spring hangers, steering knuckles, steering-knuckle arms, steering-gear pinion-shaft, brake-shaft bearing, and brake-shaft levers, brake-equalizer bearing, high-speed lever; in fact, these simple renewable bushings are used wherever possible. In this one respect the constructon is simplified.

Removable Unit Power Plant

In all Grabowsky power vehicles a two-cylinder opposed type of motor is used, the cylinders, which are cast of a high grade of gray iron, having integral water jackets. On the three smaller models this power unit is 5½ in. bore and 5 in. stroke, but on the three-ton truck the engine is 6 in. bore and 5 in. stroke and is rated at 40-45 h.p., the rating for the smaller engine being 30-35 h.p. The construction of these two motors is identical. The unit is placed forward of the front axle and is retained to a steel subframe, the transmission, a two-speed and reverse planetary set, forming a unit with the engine on the subframe and is carried back of the front axle so that at this point there is weight distribution.

The pistons are made of the same quality of gray iron from which the cylinders are cast and are carefully finished to provide perfect working. There are four rings, three of which are carried above the hardened and ground 1¼ in. hollow steel piston pin, which is retained in the piston by set screws, wired, one of the four rings being placed below the piston pin and serving the purpose of an oil ring. All rings are of square lapped joints, and to obviate rotation are pinned in place.

The crank case is of special gray iron, ribbed, to withstand strains certain to be imposed on this feature of the constructon. The oil supply is carried in the bottom of the case and the timing gear is carried in the upper portion, at which point a removable cover is fitted, this being bolted to the crank case itself.

The crankshaft is a solid one-piece drop-forging of chrome-nickel steel, 1¾ in. in diameter, this member being machined all over and ground on the bearing surfaces. The connecting-rod bearings are 2¼ in., long, all bearings being of Parson's white brass. Connecting rods are I-beam section drop-forged steel.

The flywheel is a cast-iron member keyed to the crankshaft and is 19½ in. in diameter, face of 3 in.

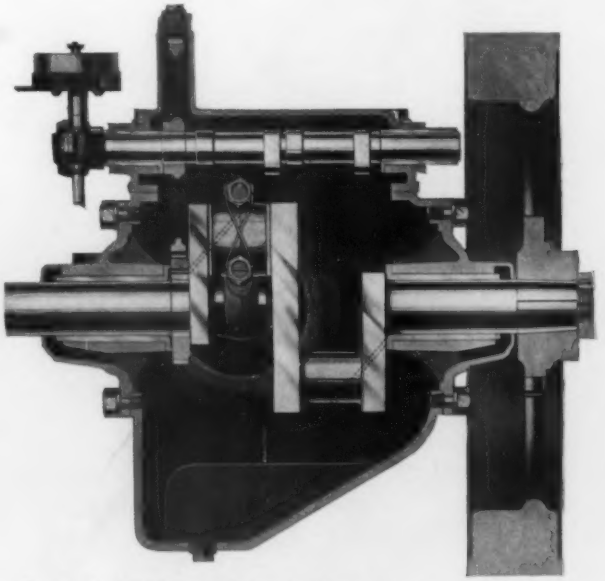


Fig. 3. Sectional View of Grabowsky Motor; showing method of oiling crank pins and method of securing connecting rod caps

The motor valves, which are placed side by side, are 2¼ in. in diameter, the stems being chrome-nickel steel, while the heads, screwed to the stems, are of cast iron, this metal being used in the heads by reason of the fact that it is less susceptible to expansion than would be the case with the closer grained and harder metals.

The cam shaft is turned from the solid bar of a special alloy steel and is ground to size, 1¼ in. in diameter, the cams being formed integral. The timing gear is completely enclosed in the top of the crank case and may easily be reached by removing the cover plate held in place with bolts.

For the push rods, steel tubing is used, this being 15-16 in. in diameter, hardened and ground, and rounded at the base or point of contact with the cam. The bronze bearings in which these push rods operate are 4 in. long.

Planetary Transmisson

The transmission is one feature of truck construction that is the cause of more or less discussion. The planetary gear type has its following, included with which are the Grabowsky builders, who, from experience are pretty well satisfied that it meets service demands in a manner most to be desired. As mentioned in the foregoing text, this Grabowsky gear set is carried on the subframe, forming a unit with the motor. There are the usual two speeds ahead and one reverse, the diameter of the drum being 12 in., gears rotating on pins 15-16 in. in diameter, the friction bands being of spring steel and lined with a composition of asbestos and copper. The high-speed clutch is of the self-retaining cone type. A special analysis steel is used in the making of the Grabowsky transmission gears, and this is given a special heat treatment, after which it is hardened. The results attained in this manner are most satisfactory and gears taken from sets in use for two years show no wear. End thrust is cared for through a ball thrust bearing having ⅜ Hoffman balls. Gears are of 1¼ in. face.

As pointed out above, this transmission with the motor forming a unit power plant carried on a subframe is readily removable. The side members of the subframe register with similar members anchored to the frame proper, so that the entire unit, after the loosening of two bolts and uncoupling a few connections, can be slid outward from the car, just as a desk drawer is opened. The wise user of motor trucks having learned that the successful use of this equipment depends on how well he does things, is pretty apt to have a spare power plant about in case of emergency which, when it does arise, is very readily met. As it requires only fifteen minutes, at the most, to withdraw one unit and substitute another, it follows that the owner of a Grabowsky need never lose time if anything happens to the engine, and he has another on hand which, after all, is only "good business." The cross bar of the frame forward is hinged, and this member carries the starting handle. When it is desired to remove the power plant this cross member is simply swung to one side just as a door is opened; the piping connections are uncoupled, the ignition cables, fitted with a quick-detachable plug with a bayonet lock, are withdrawn and there, in a jiffy, is the whole thing.

Fig. 4. Type of Grabowsky Body Used by a Furniture and Piano Mover. Such bodies are also largely used by bakers and brewers, as the side stakes can be removed and goods removed from the front of the car without disturbing the rear.

The connection between the transmission and the jack shaft is a 1¾ in. propeller shaft equipped with two universal joints. The jack shaft, 1½ in. in diameter, an alloy steel member, is located 32 in. forward of the rear axle, the carriers or retaining brackets being riveted to the frame side members, the shaft being encased in a steel tube and rotating on taper-roller bearings. The differential, with special heat-treated and hardened gears, is located on the jack shaft, the bearings and gears operating in thin grease. The radius rods, tubular in design and adjustable, are placed close to the drive sprockets and are on exact centers with both jack shaft and the rear axle.

Fig. 5. Flare Board Express Body Fitted to Grabowsky Truck; used by a baggage transfer company. The flare boards are made low, so that the trunks can get the correct slant to stay on the car

Double Side-Chain Drive

Final drive is through double side chains, the driving sprockets being re-

tained to the outer ends of the jack shaft having a taper fit On the two-ton truck the front sprockets are of twenty-two teeth and these, of course, may be varied to conform with conditions of each special service and speed demanded. The rear sprockets are riveted. Whitney roller chains are used on the Grabowsky motor trucks, these being of 1¼ in. pitch.

Frame

The frames of Grabowsky power wagons are of pressed-steel, channel-section, reinforced by cross members, hot-riveted throughout and strongly braced at the corners. Subframes are also hot-riveted, and as a precaution and for additional security, they are autogeneously welded.

On the one-ton truck the frame material is 3-16 in. stock, 2 in. wide and 4 in. deep, and on the 1½- and two-ton models the frame stock is ¼ in. thick, 2 in. wide and 4 in. deep. On the three-ton Grabowsky truck the frame is 40 in. wide, 14 ft. long, 4⅛ in. deep and 2½ in. wide, the stock being ¼ in. thick.

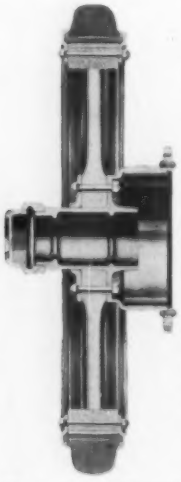


Fig. 6. Section Through Grabowsky Rear Wheel

The rear end of the frame is cross and corner braced by gusset plates ¼ in. thick and 6 in. wide.

Springs

Grabowsky motor trucks are equipped with semi-elliptic springs forward and platform type rear, for these the best of oil-tempered spring steel being used, the members on all models being 44 in. long, front and rear; on the one-ton car, 2¼ in. wide; on the 1½ and two-ton cars, 2½ in. wide, and on the three-ton truck, 3 in. wide. Springs are retained in the usual manner, in brackets on the side members of the frame, these being of cast steel, hot-riveted in place. Spring seats are separate and springs are clipped in the usual manner to the axles.

Axles

Front and rear axles of Grabowsky trucks are forged of special axle steel and are rectangular in design, the front member being formed with integral steering jaws. On the one-ton truck the members, front and rear, are 1½ in. wide and 2¼ in. deep; on the 1½-ton model, 1⅝ in. wide and 2½ in. deep; on the two-ton truck, 1⅝ in. wide and 2¾ in. deep; but on the three-ton model the front member is 1⅝ in. wide, 2¾ in. deep, while the rear axle is 1¾ x 2¾ in. The steering knuckle pin on the one-ton truck is 1 in. in diameter, on the 1½-ton model, two and three-ton cars, 1⅛ in. in diameter. Both front and rear axles are fitted with taper roller bearings of large dimensions.

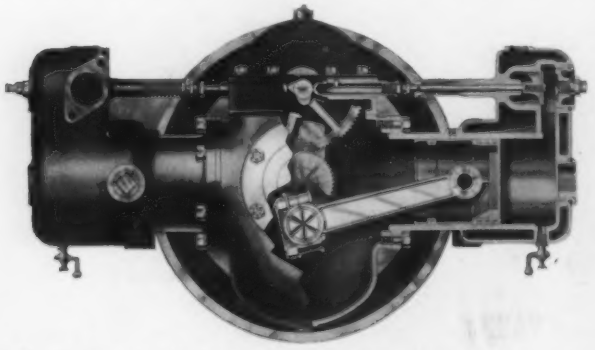


Fig. 8. Sectional Side View of Grabowsky Motor; showing gear Construction, piston, rings, connecting rods and valve passages and mechanism

Wheels

Wheels are wood, artillery pattern, of the following sizes: one-ton model, 32 x 3½ front and rear; 1½-ton model, 32 x 4 in. front and 34 x 4 in. at the rear; two-ton truck, 32 x 4 front and 34 x 5 rear; three-ton truck, 34 x 4 front, 36 x 3½ dual rear.

Regular tire equipment is the flange type of standard side wire tires.

Pinion and Sector Steering Gear

The Grabowsky trucks are fitted with the pinion and sector type of steering gear, and to overcome looseness resulting from worn gears, the steering shaft bearing is made eccentric, permitting of almost any desired adjustment between the sector and pinion, and both ends of the steering rod are of ball and socket construction. The case is cast steel and is provided with a liberal sized cover plate, so that the working elements are exposed when the cover is removed. The steering arm is formed in one piece, drop forged, and is provided with a detachable ball, so that in case of wear this may be replaced. The gears operate in thin grease. The Grabowsky trucks are steered from the right, the steering column being vertical to ensure an easy position for the driver. The steering rod assembly is carried aft of the front axle, and therefore protected by it. On the three-ton truck the steering wheel is 18 in. in diameter, on the other cars 16 in. in diameter.

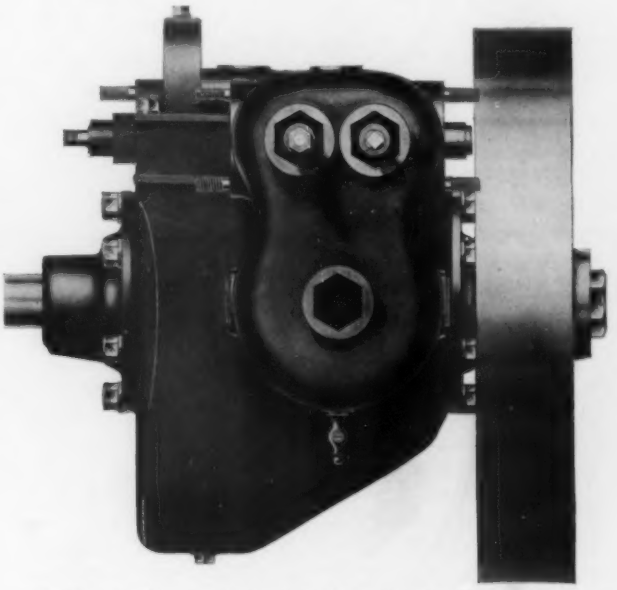


Fig. 7. End View of Grabowsky Motor; showing plug in cylinder head, which is of the dome style, and plugs over valves. These plugs can be removed with an inside spanner wrench.

Brakes

The rear wheel brakes of Grabowsky power wagons of the internal expanding type are actuated through a hardened steel wedge between two hardened rollers, and raising of this wedge in case of wear provides a simple means of adjustment. Lining is of a fibrous non-burning material. These brakes, on the one-ton truck, are 2½ x 9 n., and on the 1½-ton model and also the two-ton car, they are 2½ x 11⅝,

while on the large car they are 12 x 2½ in. These rear wheel brakes are worked by the hand side lever through steel pull bars to a rocker shaft equalizer and the drop-forged brake levers on the rear axle. The pull bars are adjustable. The emergency brake is of the contracting band type and works on a drum on the engine shaft next to the transmission, this being 2¼ in. wide and 10 in. in diameter.

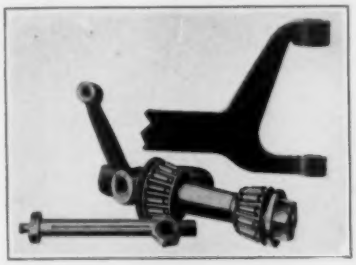


Fig. 9. Front Axle Components: roller bearings, spindle, steering knuckle, etc.

Control

The control of the Grabowsky cars is simple. The low speed is worked by a foot pedal in the floor board and the reverse is accomplished in the same manner. The high speed forward is engaged through the hand side lever within convenient reach of the driver, by a forward movement of the lever, while a backward motion works the rear wheel brakes. The throttle lever is at the right under the steering wheel, the spark lever on the left under the wheel.

Cooling

The Grabowsky motor is of the water-cooled type, the water jackets being formed integral with the cylinders. The natural method of thermo-siphonaction is depended upon to produce the desired results and the system, as involved in these cars has, according to the builders, worked out well. The thermo-syphon system is more in vogue now than in the past and it is worthy of note that it prevails on many of the best cars of Europe. To say the least, it simplifies the cooling system materially. The Grabowsky radiator is of the honeycomb type and is carried between the frame forward and is backed by a sheet metal plate which in reality forms the dash for the car, this steel dash being provided with a large round hand hole cover held by a thumb screw. The fan, a six-bladed affair, belt-driven from the motor and supported in a bracket on the radiator, can be used by the driver to good advantage in cold weather, since drawing the warm air from the motor the driver has only to open the cover plate in the dash, and with side curtains to his cab the inrush of warm air from the motor will render his compartment quite warm and comfortable. The cooler is of strong construction and is designed to stand hard service. One salient feature of the member is that it is provided with an expansion chamber, so called; that is to say that, above the water line, there is a clear open space, which serves admirably as a condenser. This tank is 4 in. above water line. The water circulation is from the base of the cooler to the bottom of the cylinders, around the valve chambers, where, heated, it is forced by convection back to the radiator. The water manifolds are of brass, that used for the cold water being 1¼ in. in diameter, for the hot, 11-16 in. in diameter.

Ignition

Ignition in the Grabowsky trucks is by high-tension system, jump spark with magneto and storage battery. The coil is carried under the driver's seat in the heel board and is within convenient reach. The magneto is driven from the cam shaft and the spark plugs are placed over the inlet valves. The battery is carried in a separate compartment under the driver's seat; the timer is driven from the cam shaft.

Fig. 10. Rear Axle Spindle; showing internal brake shoes and square cam and rollers operating the same

Lubrication

The oil supply of the Grabowsky motors is stored in the base of the crank case, below the connecting rod level, and is pump-driven from the cam shaft, there being a sight feed and gage at the entrance to each bearing. Holes are drilled diagonally through the throws of the crankshaft to the connecting rod bearings. Surplus oil returns through the cranks and journal bearings to the oil well to be pumped and used over again. With oil leads direct to the cylinders and main bearings the motor is well provided for.

Carburetor

A Breeze automatic carburetor is used on the Grabowsky trucks, this being carried on the left side of the motor. The fuel feed line, from the tank under the driver's seat to the carburetor, is copper. The inlet manifold is 1½ in. in diameter, the exhaust being 1⅝ in. in diameter. When the unit power plant is removed from the frame the muffler line is disconnected through a simple quick-coupling device. The muffler is carried well back on the left side of the frame and is designed to give a low back

Fig. 11. Tank Body Fitted to Grabowsky Truck; for carrying oil

pressure with a silent exhaust. Compression relief cocks are fitted in the heads of the cylinders.

Bodies

The Grabowsky Power Wagon Company builds bodies of special design to suit the requirements of purchasers. The line of standard equipment is most comprehensive and ranges from out-and-out delivery wagon and truck types to special equipment, such as ambulances and vehicles of other description intended for public or municipal service. The standard delivery car, one-ton capacity, fitted with a panel body, is $2500 f.o.b. Detroit, the body dimensions being 4 ft. 8 in. high by 4 ft. 9 in. wide and 8 ft. long. The 1½-ton wagon is of larger dimensions. The three-ton truck lends itself to a wide range of body equipment, since this is a size of car very generally used for heavy work.

The Grabowsky Company warrants all cars sold by it one year from date of shipment. The slogan of this concern is, "We guarantee service."

The Mais Internal Gear Driven Commercial Cars

BY WILLIAM J. JOHNSON

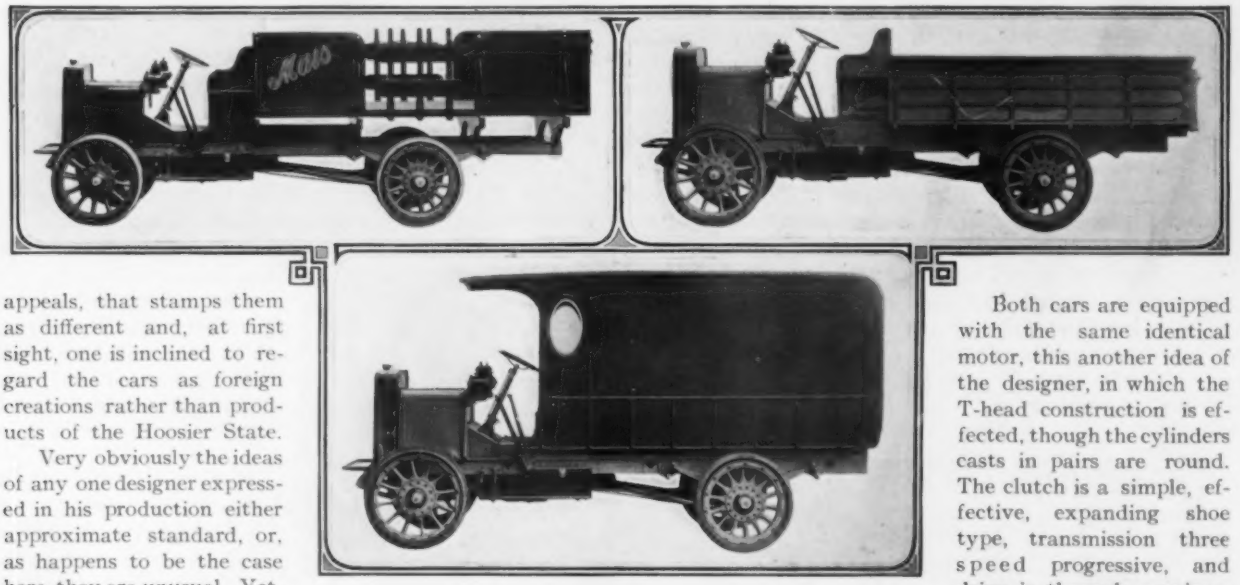
INDIVIDUALITY of design and construction marks the Mais internal gear driven commercial cars, manufactured by the Mais Motor Truck Company, of Indianapolis, Ind., of which Will H. Brown, well known in the automobile industry, is President and General Manager. In fact, this Mais production built in two sizes of chasses bristles with unusual departures, which, duly noted, impress one with the distinctive ideas entertained by the designer, Albert F. Mais, who is also Vice President of the Mais Motor Truck Comany.

To one who in any sense has to do with the transportation problem, or, who is interested in commercial car construction, there is that intangible something about the Mais chassis that appeals, that stamps them as different and, at first sight, one is inclined to regard the cars as foreign creations rather than products of the Hoosier State.

Very obviously the ideas of any one designer expressed in his production either approximate standard, or, as happens to be the case here, they are unusual. Yet, on the whole, the construction is such as to make for a satisfactory unit, solid, efficient and reliable, built for business. The Mais chassis is an out and out commercial proposition, there are no makeshifts about it. Judged by a detailed inspection of the parts that make up the car, the materials employed, the methods of production, the Mais commercial car has every appearance of a vehicle thoroughly "fit" in every respect.

Of the more prominent features of the Mais construction expressing the ideas of Albert F. Mais, the designer, the internal gear drive is by far the most prominent since at present there is much discussion as to the relative merits of the live rear axle system, worm drive, or otherwise. In this construction a live rear axle is effected by means of an internal gear in each rear wheel. That is pinions of the spur type on the outer ends of each of the live driving axles mesh in internal gears on the rear wheel drums, the outer faces of which are utilized for braking.

Briefly summed up, the Mais chasses are made in two sizes, the one and one-half ton chassis which sells for $2750 and the two and one-half ton model which sells for $3000.



Group of Mais Trucks
Showing the stake, the open and the panel-body delivery cars

Both cars are equipped with the same identical motor, this another idea of the designer, in which the T-head construction is effected, though the cylinders casts in pairs are round. The clutch is a simple, effective, expanding shoe type, transmission three speed progressive, and drive is through a universal jointed propeller shaft to the live rear axles which in turn impart the effort through the spur pinions to the internal gears above mentioned. Motor, clutch and transmission are a single unit, three point suspended.

The officers of the Mais Motor Truck Company are: Will H. Brown, President and General Manager; Albert F. Mais, Vice-President and Chief Engineer; Alfred W. Mark-

ham, Secretary and Treasurer; C. H. Wallrich, Assistant General Manager; F. E. Mile, Purchasing Agent. Messrs. Brown and Wallrich are well known throughout the motor car industry in this country, and Albert F. Mais, the designer of the car, is also well known in engineering circles.

Long-Stroke Engine

The long stroke engine has generally come to be regarded as best for commercial car use and the Mais unit favors this construction, being a four-cylinder vertical water-cooled member disposed under a forward hood, readily accessible. A glimpse at the accompanying illustration will show wherein the Mais engine differs. The cylinders, while affecting the T-head design, are in reality round, 11½ in. in diameter, the outer or water jacket walls continuing to the flanges, so that the space thus gained is used as a housing for the valves. The openings or housings are closed in with aluminum cover plates, held in place through long steel studs fitted with small hand wheels. Thus the working elements are well protected.

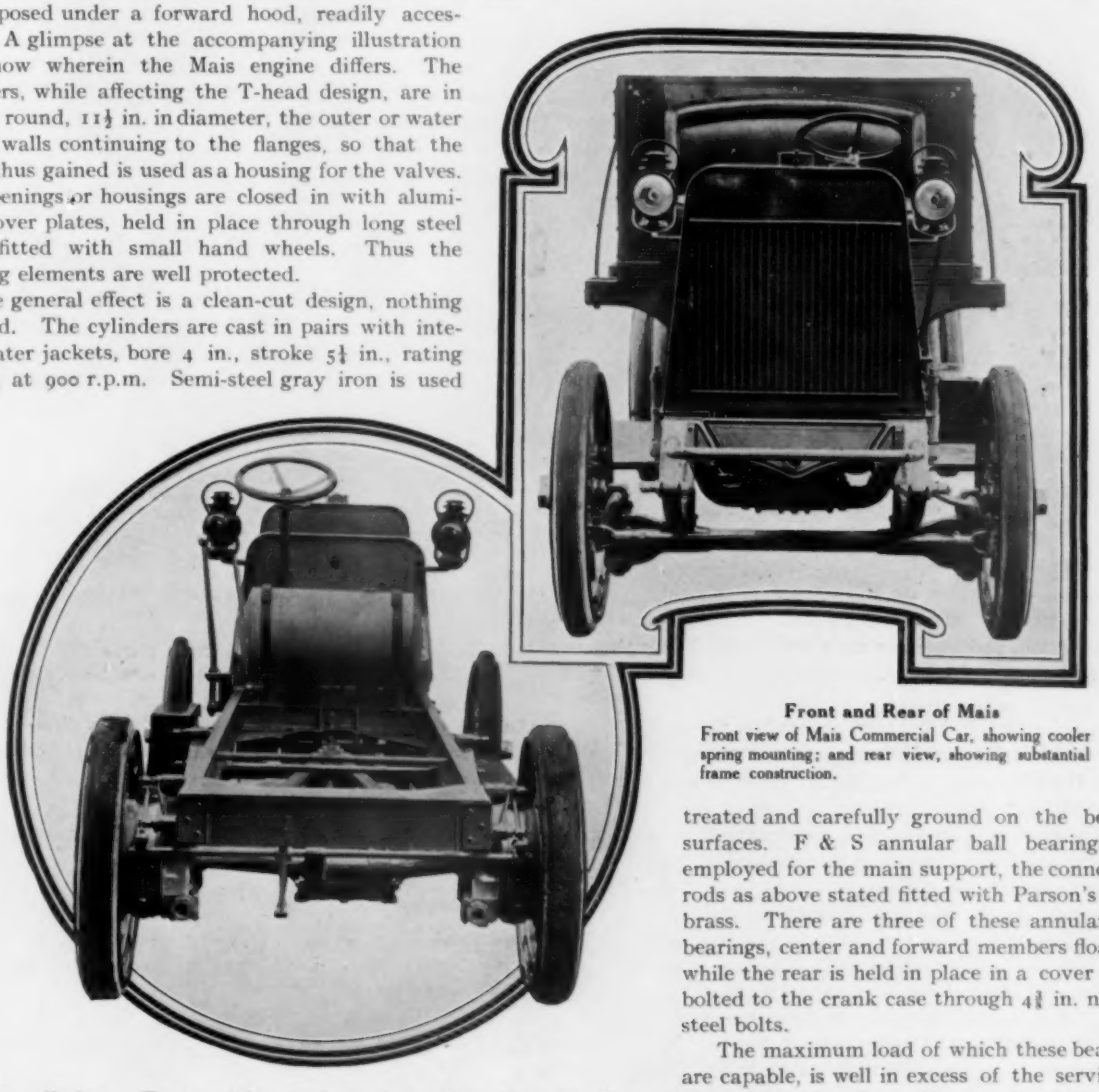
The general effect is a clean-cut design, nothing exposed. The cylinders are cast in pairs with integral water jackets, bore 4 in., stroke 5¼ in., rating 24 h.p. at 900 r.p.m. Semi-steel gray iron is used for the cylinders. Ten 7-16 in. steel studs anchor the cylinders to the crank case.

Pistons are flat topped, fitted with three diagonal lap ¼ in. compression rings disposed above the 1½ in. hardened and ground steel wrist pins which are secured in the connecting rods, bearing on the piston bosses, this affording a steel to cast iron bearing. Another eccentric ring is placed well below the pin. Deep oil grooves are cut in the pistons to facilitate lubrication.

The connecting rods are drop forged steel, H section, 11½ in. center to center, the big end bearings being Parson's white bronze. Big ends are held together with four ⅜ in. nickel steel bolts.

Ball-Bearing Crankshaft

Designer Mais favors the use of annular ball bearings for the support of the crankshaft. While this construction cannot be considered daring yet is one which has caused about as much discussion in motoring circles as any. The argument here is that with proper construction which implies a stiff, staunch crank case, among other things, ball bearings are the best for crank support. The shaft in this Mais engine is a solid 3½ per cent. nickel steel forging, oil tempered and heat treated and carefully ground on the bearing surfaces. F & S annular ball bearings are employed for the main support, the connecting rods as above stated fitted with Parson's white brass. There are three of these annular ball bearings, center and forward members floating, while the rear is held in place in a cover plate bolted to the crank case through 4¾ in. nickel-steel bolts.



Front and Rear of Mais

Front view of Mais Commercial Car, showing cooler spring mounting; and rear view, showing substantial frame construction.

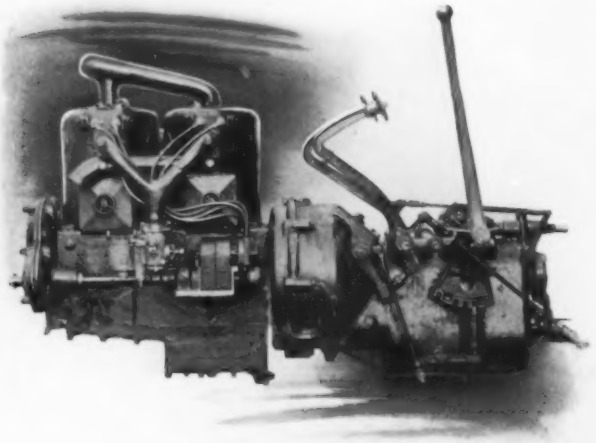
The maximum load of which these bearings are capable, is well in excess of the service in the Mais engine so that there is a wide margin of strength. The use of this type of bearing is somewhat suggestive of European practice.

To permit of the clearance of the connecting rods, the bases of the cylinders are cut away at the sides since the rods describe a pronounced arc owing to the long stroke, which would not be the case with a short stroke unit.

The cam shafts are 15-16 in. diameter and are cut from solid bars of manganese steel, the solid cam, of course, somewhat simplifying valve timing. Primary action is imparted through vertical lifters, roller base, rolls 1 in. diameter, ⅝ in. face, lifter stems 1¼ in. diameter. Valves have nickel steel heads, 2¼ in. in diameter welded to carbon steel stems, clear-

ance or lift 11-32 in., stem ½ in. diameter, springs round section steel. The retaining discs are machined from solid stock so that a guide ¾ in. long is provided, an advantage over the usual cup shaped retaining washer.

Intake valves are on the left side of the engine, exhaust on the right. The motor gears are carried in a forward com-



Intake Side of the Mais Motor

partment of the cast iron crank case, these provided with bronze bushings, the two cam shaft gears being bronze 10 pitch, 1⅛ in. face, water pump gear steel 38 teeth, 2 in. face, magneto gear also steel. The gear case is closed in with a solid aluminum cover plate retained through 12 ⅜ in. nickel steel studs. Valve cams are ¾ in. face.

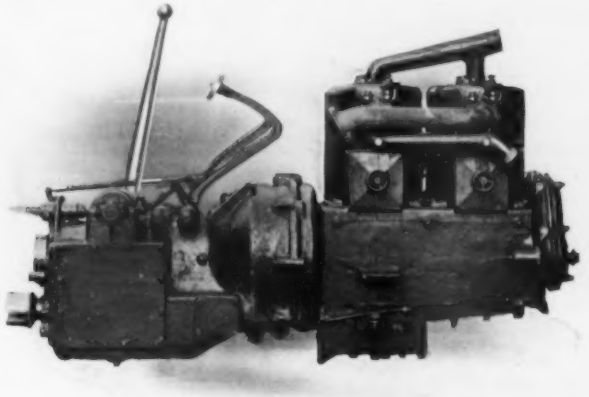
Fly wheel, cast iron, 15½ x 4 in. is keyed to the crankshaft extension, and bolted to the wheel is the female portion of the expanding shoe clutch.

Square-Design Crank Case

Another feature of Mais engine construction is the design of the crank case, this a solid member closed in at the bottom with the oil pan. Ordinary practice favors a two section crank case usually parted on the center line of the bearings, but as above pointed out, the use of annular ball bearings on the crankshaft demands a very stiff case which is best attained by making the member solid which is the reason that it is so done here. To remove the crankshaft it is only necessary to unbolt the end plate and the member may be easily withdrawn. The removal of the bottom plate permits of crank pin bearing adjustment. The rear end of the case is enlarged and forms a portion of the fly wheel housing, the other half being integral with the gear box.

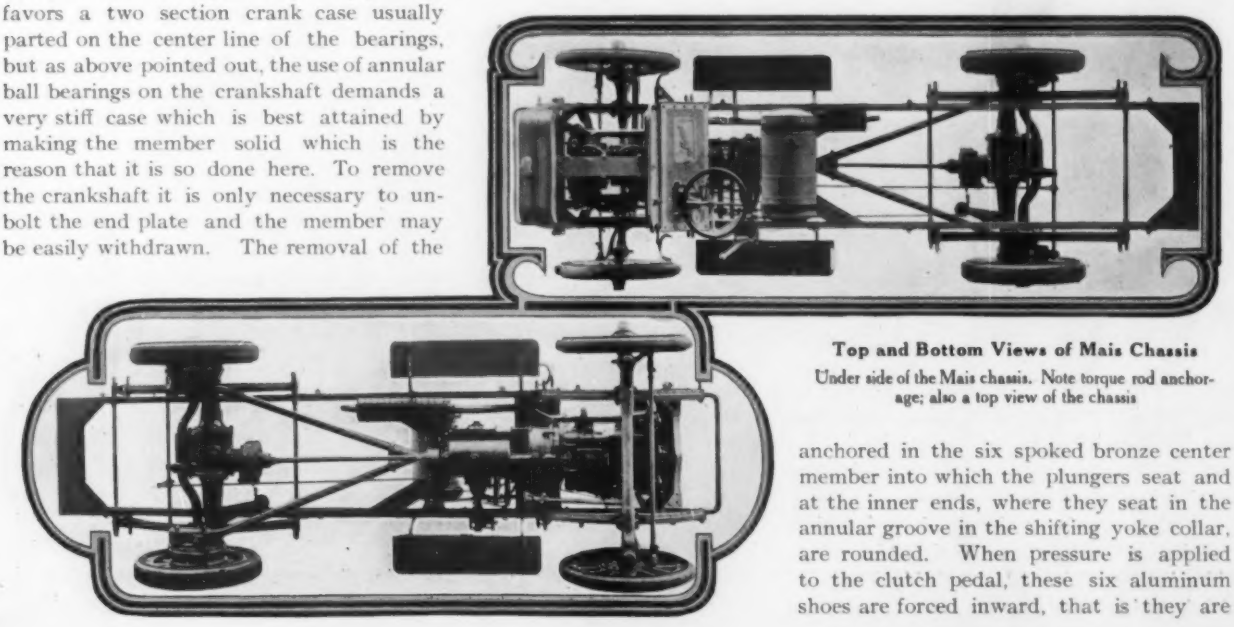
Expanding Shoe Clutch

An expanding shoe type clutch of simplified design is employed in the Mais commercial cars, this, as before mentioned, being fully enclosed in a cast iron housing formed by the enlarged end of the crank case and the forward portion of the transmission or gear case. The clutch is carried on an extension of the main shaft of the transmission and is formed with six aluminum shoes in which there are deep grooves registering with similar members in the inner face of the female member which is bolted to the fly wheel. The expanding shoes are aluminum formed with integral plungers which are seated in a bronze casting provided with steel tube liners,



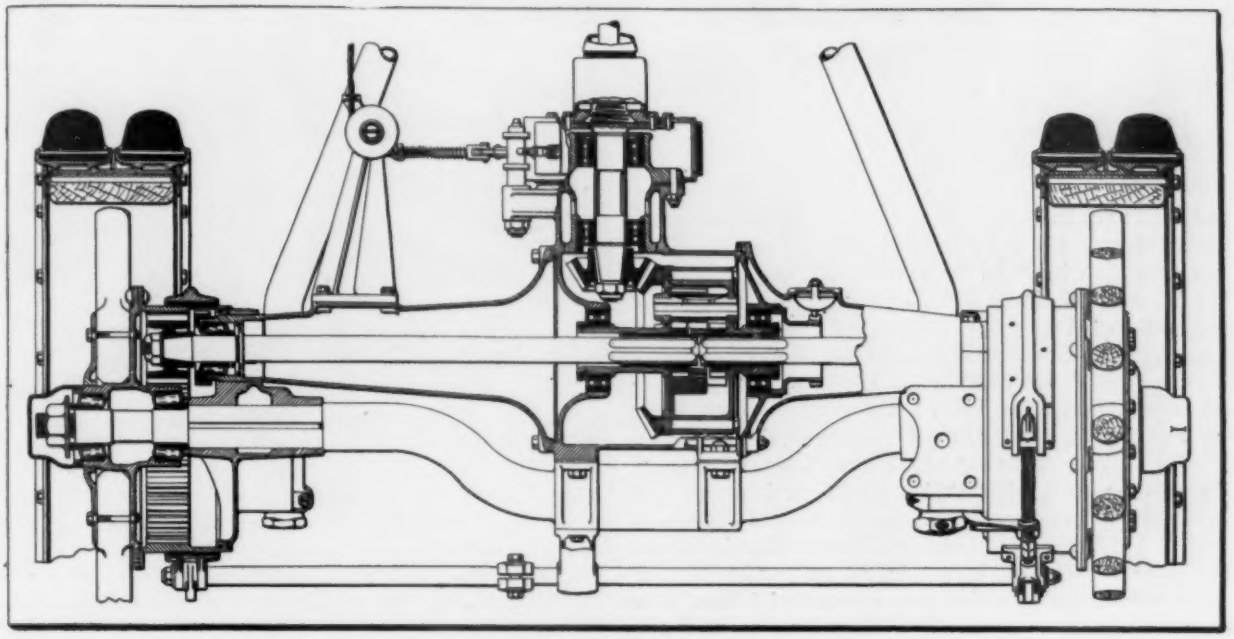
Exhaust Side of Mais Motor
Showing the unit power plant construction

at the bases of these plungers are coil springs. The releasing levers are drop forged steel, bearing is annular ball and the shifting collar drop forged steel. Each of these levers is



Top and Bottom Views of Mais Chassis
Under side of the Mais chassis. Note torque rod anchorage; also a top view of the chassis

anchored in the six spoked bronze center member into which the plungers seat and at the inner ends, where they seat in the annular groove in the shifting yoke collar, are rounded. When pressure is applied to the clutch pedal, these six aluminum shoes are forced inward, that is they are



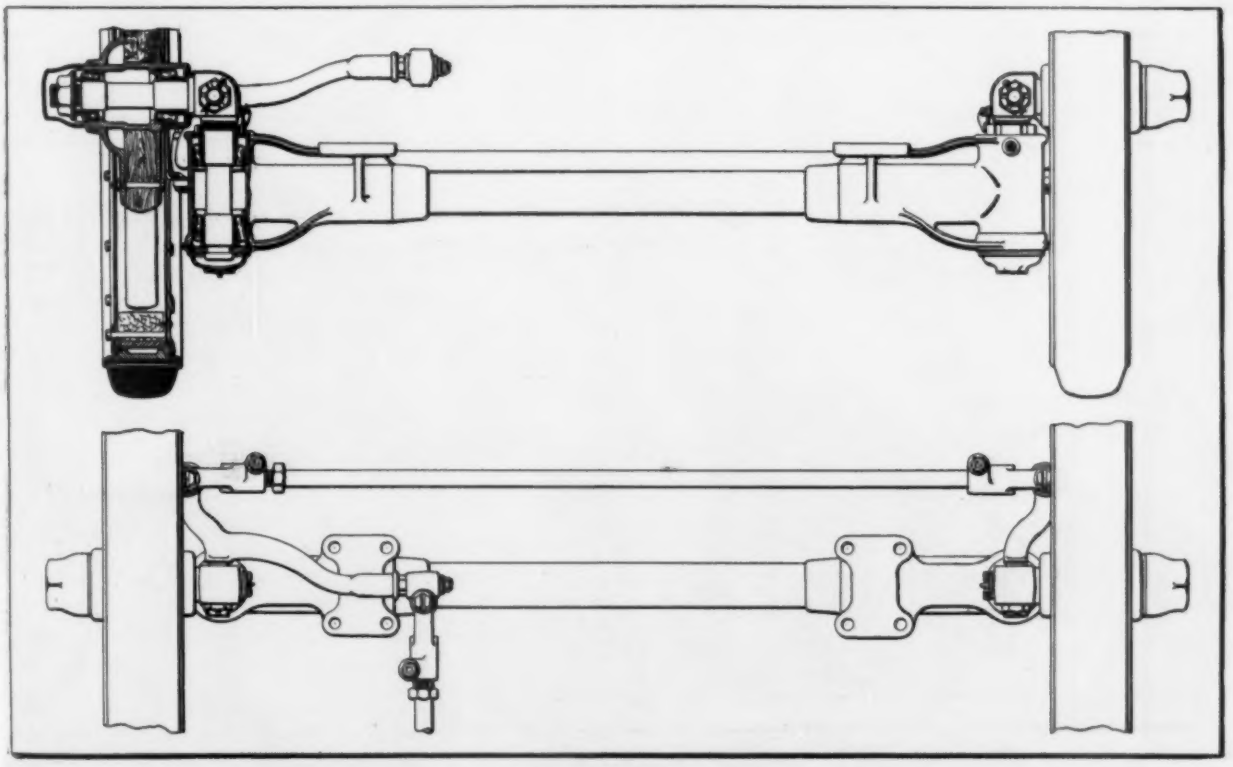
Driving Pinion and Brakes

Rear unit assembly, showing location of the driving spur pinions and corrugated brake discs

withdrawn from the female rim. The tendency under high speed, even should the tension springs weaken, would be to force these aluminum male members into the grooves of the female member through centrifugal action.

With a leeway for wear of ⅛ of an inch it is obvious that the clutch is good for long service. Clutch diameter is 12½ in.

Since the member works in oil, a clean, sweet engagement is possible and in the course of a 22-mile demonstration this point was well set forth. Replacement of clutch parts is an inexpensive proposition. The member is worked in the usual manner by a foot pedal. The clutch and components are well shown in the accompanying illustrations.



Front and Rear Axles

This drawing shows the massive construction of the axle, which is designed to take excessive strains

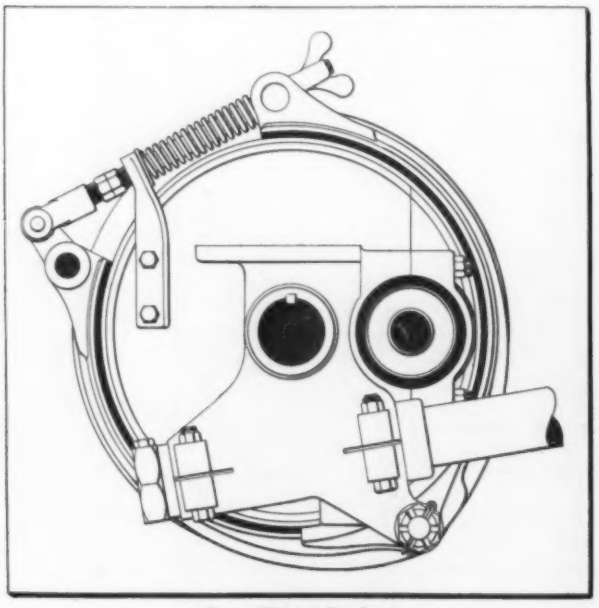
Progressive Three-Speed Transmission

The final member of the Mais unit power plant is the progressive three speed transmission, the gear box being cast iron. The main shaft is placed directly above the countershaft and there is no direct drive, the drive is therefore downward. Gears are nickel steel, shafts vanadium steel. All transmission gears are 5 pitch, high speed 1¼ in. face, first and second speed 1⅜, low speed 1½ in. face. The reverse idler is carried in the top of the case and runs in a bronze bushing. The main shaft is 1⅞ in. in diameter, being stepped up from 1¾ in., countershaft is 2⅛ in. in diameter. Both the main and countershaft operate in annular ball bearings of a guaranteed load capacity three times that of the Mais transmission.

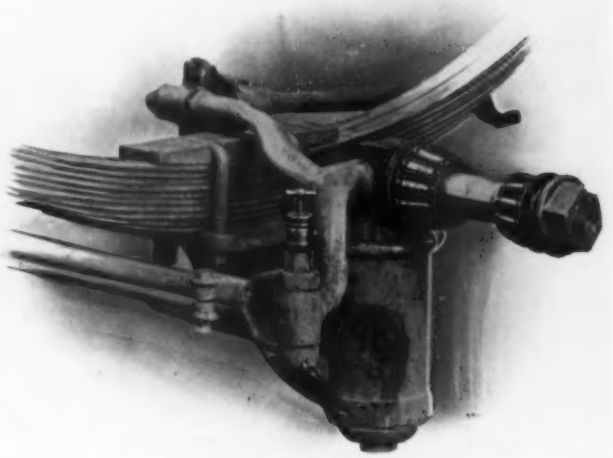
Gears are shifted by a hand side lever which is interconnected with the clutch so that changes in speed can only be made when the clutch has been fully disengaged. To prevent spinning of the clutch after release a small brake is fitted to the main shaft extension. The control lever is drop forged steel and is supported on the gear case as are the foot pedals. The third and rear support of the unit power plant is through a steel bar carried in an integral lug of the gear box through which the member is anchored to a cast steel bracket on a cross member of the frame. Drive from the transmission to the rear construction is through a 1½ in. nickel steel shaft fitted with two Universal joints.

Internal Gear Drive

As before mentioned, by far the most prominent feature of the Mais construction is the form of final drive. Common practice favors the double side chains which have much to commend them, but, in the Mais it is something different which results in a live rear axle, rigidly supported. This live rear member or as perhaps some might call it, the jackshaft, is 1½ in. in diameter squared at the inner ends where recess is in the differential. To the outer ends of the drivers, or, the jackshaft, are secured the two steel spur pinions 2 in. face which mesh in the internal gears formed on the inner face of the rear wheel drums on the outer faces of which operate the service brakes.



Rear Wheel Brakes
There are two sets of brakes. The rear wheel brakes here shown are of the external contracting shoe type, very powerful



Wheel Hub
Steering detail showing roller wheel bearings

As in live axle pleasure cars, the drivers in the Mais truck have but the one function, simply to transmit the power to the final gears which would correspond with the wheels in the pleasure car. The car load is supported on a 3½ per cent. nickel steel axle, round section, 2⅛ in. large diameter; 2 in. small diameter, wheel spindles, fitted with Timken roller bearings. The center of the supporting axle, 2½ in. diameter, is curved so that it may pass around in back of the differential housing. Two cast steel spiders are carried on this supporting axle and through them the differential housing is anchored. The driving pinions, it will be noticed in the illustrations, are forward of the center of the supporting axle so that they mesh with the forward face of the internal gears. The jackshafts are held in position through steel studs and collars in the brake discs. This provides a single construction and one in which renewal of parts is easily made. The entire mechanism is enclosed and works in grease. The enclosing discs are formed with two channels which are filled in with felt to exclude dirt.

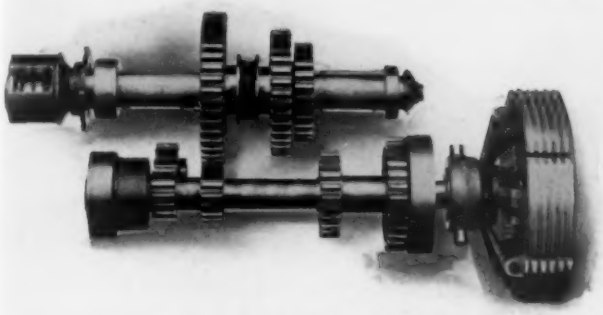
The differential is of the spur gear type, the small bevel running on ball bearings. The large bevel is also fitted with ball bearings while the jackshaft outboard bearings are Timken roller. The differential housing is cast steel, and secured to it through 9-16 in. steel bolts are the jackshaft housings. Spiders are carried on the axle proper, these support the differential housing, form the rear spring seats and the abutments for the torque tubes.

Massive Torque Tubes

Triangular torque tubes are fitted, these formed of 2¼ in. diameter steel tubing, these secured at the rear to the spiders which form the spring seats and meet forward in a bronze casting, supported through a steel bolt in a bracket on a cross member of the frame which also supports the transmission case. A heavy coiled spring buffer is fitted.

Front Axle

The front axle is a tubular steel member 2¾ in. in diameter fitted with bronze steering ends. The steering pivot pins are supported in two Timken roller bearings, one opposed to the other and adjustments may be made from the bottom of

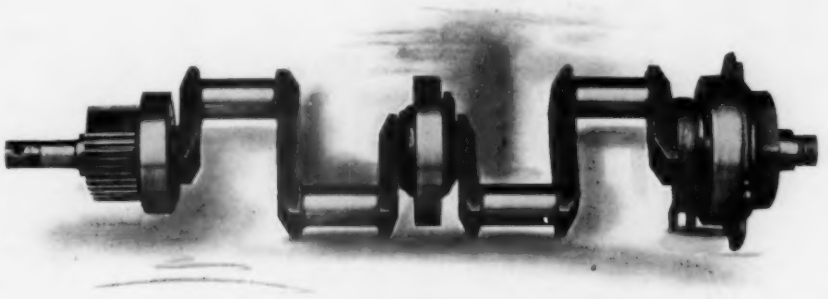


Main and Countershaft of Mais Transmission
Showing clutch on main shaft, and governor pinion on the countershaft

the case. The matter of assembly here is interesting. After exhaustive tests, designer Mais is of the belief that bronze is best suited here, hence it is used. 3½ in. steel pins are inserted in the ends of the axle tube and the bronze steering ends are cast directly on and about the axle. It is claimed that this method affords much better results than would otherwise be had,. Wear is taken up through an adjustment nut. The steering arms are of large size.

Frame

The side rails of the Mais frame are made of 5 in. section nickel-steel channels, two large gusset plates being fitted at the rear and these extending across the frame. The front cross member has integral with it the bracket for the starting handle. Another cross member to the rear of this forms the forward support for the power plant. The center cross member of the frame, which supports the power plant and the torque tubes, is sufficiently heavy to answer all practical purposes. Front and rear spring ends, rear sets, are anchored in brackets which are supported by 1¼ in. steel cross rods. To protect the cooler a 1½ in. buffer bar is fitted. Height from ground under normal loads is 29 inches.



Ball-Bearing Crankshaft
Nickel-steel crankshaft with annular ball bearings in place, showing end retaining plate

Wheels

Wheels are wood, artillery type, front members 12 spokes 2 in., rear 14 spokes 2½ in. Tires are 36 x 4 in., solid rubber front, 36 x 6 or 36 x 3½ in. dual, rear.

Springs

Front and rear springs are semi-elliptic in design. The front members are 43 x 2½ in. and composed of twelve leaves. The rear sets are 36 x 3 in. and of eighteen leaves, each leaf front and rear being ribbed in the center which precludes possibility of side play. Krupp silico manganese steel is the material employed in the Mais spring construction.

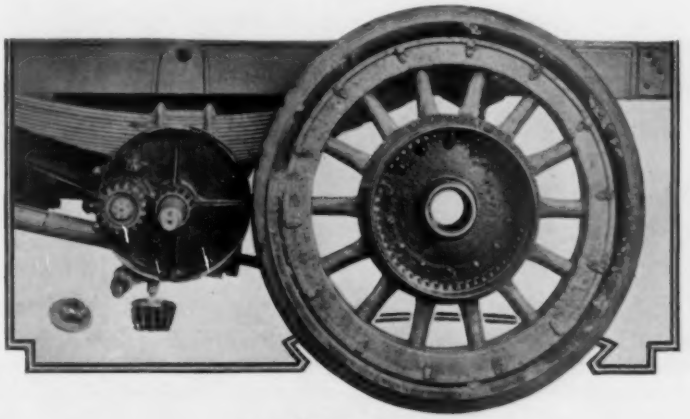
The front springs are anchored forward in cast-steel brackets riveted to the frame rails and rear in side steel plate shackles. The rear members at front and rear supports are held in side steel plate shackles secured to cross bars extending from one frame side rail to the other and supported in cast-steel brackets riveted to the frame sides. Spring clips are heat-treated nickel-steel, ¾ in. diameter.

Brakes

There are two sets of brakes, one set on the rear wheel drums, the other on the pinion shaft drum, both of the external contracting order, and, in addition there is the clutch brake before mentioned which prevents the clutch from spinning after disengagement, which is sometimes an annoyance, especially when it is desired to change quickly from one speed to another. The service brakes are 14 x 3 in., these on the rear wheel drums, the tension of which may be regulated as desired. The emergency brake on the bevel pinion shaft is 10 x 3 in. The service member is of course actuated through the foot lever, action being imparted through a steel rod from the equalizer, while the emergency brake is applied through a steel cable which engages on a steel grooved pulley held in a steel bracket bolted to the left side of the jackshaft housing. The service brake rocker shaft is carried aft of the rear axle and is supported in a bracket attached to the axle.

Automatic Spark Advance

Ignition is from a high-tension Eisemann magneto with automatic spark advance so that the ignition is cared for at all engine speeds without the aid of the driver. The magneto is carried on a bed plate cast integral with the crank case and is driven from the motor gears through a ¾ in. steel shaft and is located on the left or intake side of the engine, the spark plugs being in the sides of the cylinders. On the right side of the motor is another bed plate cast integral with the crank case to which an auxiliary instrument may be fitted if desired.



Rear Wheel Removed
Showing the spur gear and the internal gear forming the drive

Carburetor

An automatic float feed carburetor controlled from the steering column is fitted, this being provided with a warm air jacket, the air being led from the exhaust manifold on the right side of the engine through a brass bound flexible tube. The intake manifold is a Y-shaped affair bolted to the cylinders in the usual manner. The exhaust is gray iron on the right side of the motor, the muffler being supported to the right frame rail. The fuel tank is of 23 gal. capacity, is cylindrical in form and is retained in two cast steel brackets secured to the frame under the driver's seat, two leather straps being used for anchorage of the tank. Feed is by gravity.

Expanding Shoe Clutch

Six aluminum shoes formed with integral plungers seat in the center bronze casting. Note corrugations in the female rim, which is bolted to the flywheel.

Lubrication

A self-contained oiling system is used, the oil being stored in the bottom of the crankcase, this member at the rear being square in design and deeper than forward. This aluminum bottom plate is retained to the crank case proper through 18¾ in. steel studs. A plunger oil pump is driven through an eccentric on the crank shaft, and this induces sufficient oil to properly care for the motor at all speeds. The oil is filtered and raised through a brass pipe thence to four troughs inside the crank case. The connecting rods then dipping in the bath provide the splash. Circulation is at the rate of ½ gal. to 800 revolutions. Overflow is passed back to the lower level to be filtered and used again.

Steering

The steering gear is of the worm and sector order, case cast steel, bearings Timken roller and annular ball, former being used on the vertical section of the gear. The steering post is 1¾ in. in diameter, wheel 18 in., the gas lever as before stated being on a quadrant under the wheel. The steering rods are 1⅛ in. in diameter and are made of nickel steel. The cross connection is carried forward of the front axle. The steering arms are of liberal dimensions and are bronze bushed. The steering post is supported in a cast-steel support secured to the aluminum floor board.

Cooling

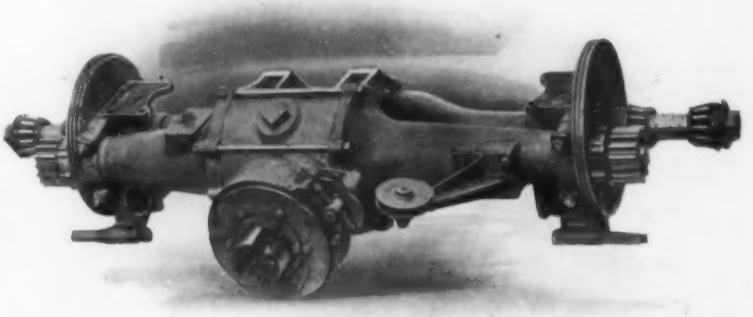
No fan is used on the Mais commercial cars, the high duty bronze gear pump and commodious radiator being deemed sufficient for all practical purposes. The water pump is located on the right side of the engine and is driven from a gear and shaft, the former in mesh with the motor gears. The pump is bronze throughout, the intake 1⅛ in. in diameter, the return 1¼ in., both secured through steel studs in the usual manner. The tubular cooler is supported on two spiral springs and anchored through two ⅞ in. steel bolts, the shocks imposed on the chassis forward that would be likely to damage the cooler under ordinary conditions being absorbed through the coiled springs. As previously mentioned the jacket walls are continued to the base and the closed in space thus derived is employed to house the valve stems and the bronze lifter guides.

Transmission Governor

Designer Mais deems it good practice to fit a governor to his vehicle, but he differs from the general idea in that he is of the opinion that the governor should be operated in accordance with the speed of the car and not the motor, as, otherwise the full benefit of the power of the motor could not be obtained at slower speeds. The instrument employed here is of the usual fly ball type fitted with a sliding fork which operates a butterfly valve in the intake manifold. This member is carried in the transmission housing and the case is made of bronze, the fly balls, drop forged steel sliding fork bronze and spring steel, the action of the instrument being determined by the setting of the spring. The governor shaft is fitted with a gear which meshes with a similar member on the countershaft.

Control

The Mais commercial cars are steered from the left. The clutch pedal is at the left and connected with this is a pull bar operating a vertical plunger which registers in the various slots in a quadrant determined by the transmission speeds selected. When the clutch is in position the vertical shaft or plunger registers in the slot of that particular speed, as the pedal is thrown clear forward, the plunger is withdrawn which permits the operator to shift speeds. The right pedal is used for the service brakes, while the usual hand side lever works the pinion shaft brake. The clutch as before mentioned is fitted with a brake to prevent spinning. Control levers are drop forged steel, both ball topped. The ignition being automatically controlled, the operator has but to care for the gas. The tread is 58 in., 2 in. wider than standard, this being purposely so as to overcome the proclivities of drivers to follow the car tracks, which practice increases the cost of tires during a season.



Separate Supporting Axle and Driving Shaft

Showing the supporting axle and the driving pinion, internal gear in the rear wheel drum to the right

Bodies

The large and small Mais trucks differ only in minor details and either model is to be had with all sorts of bodies according to the needs of the purchasers.

Road Performance

During a visit to the Mais factory the writer was accorded a demonstration in the large car, this being 22 miles for the round trip. The vehicle carried a 50 per cent. overload and did not apparently labor under the excess.

Al Aldrich was at the wheel, and for the benefit of the writer, put the car through such paces as would tend to prove whether or not it was all that was claimed for it. One noticeable feature was the ease of riding under full load. There was a smooth and easy spring action and the engine worked very satisfactorily. The road from the factory to Shelbyville is of the ordinary country sort, the travel for the greater part being horse vehicles, the animals, as usual, wearing a deep rut in the middle of the highway, this being anywhere from 8 to 12 inches deep. On either side of the rut was a fairly hard track, smooth in spots, in others rutty. In crossing car tracks, cross walks and bad spots the springs worked very smoothly. There was not that annoying "come back" so noticeable with some cars. The trip continued for 11 miles out of the Shelbyville road, with the same distance back to the factory. Another noticeable feature of this demonstration was that the car would be operated at a good rate of speed without pounding all over the road. Several grades were negotiated and in the entire trip to and from the factory, in the 22 miles of running Aldrich shifted gears but once, and it is more than likely that if a bridge had not interfered at the base of the offending grade it could have been taken on the high gear. The clutch to all appearances worked very smoothly, there was no slip on any of the grades traversed. While no attempt was made to drive the vehicle at top speed the entire run was made in good season, so that one way, 11 miles would approximate a round trip in usual city service, the whole run a half day's work, but, judging by the actual performance here, the vehicle could easily do 60 miles in a day's time with a load at all times. Viewed from any angle the demonstration was very satisfactory.

The Situation Among the Brewers of Denver, Colo.

BY C. M. SMYTH

While the merchants of Denver have been somewhat slower to grasp the commercial car problem and install motor trucks in their delivery business, in comparison with the merchants of some eastern cities, it seems that those in the brewing business are even more dilatory. Only two Denver brewers are, at the present time, using commercial cars for delivering their wares, the third having made an unfortunate trial a year or more ago.

Almost Persuaded

The largest brewing concern in the city—the Trivoli Union Brewing Co.—has been considering the possibilities of installing motor trucks for some time, but up to the present has found nothing that appeals strongly enough to warrant giving it a trial. They are now using some 26 horse-drawn wagons and are of the opinion that proper cars judiciously managed will effect a considerable saving in their delivery expense account. Manager S. A. Leberer thinks it will be advisable to first try trucks with a capacity sufficient to deliver large loads to the different distributing stations throughout the city.

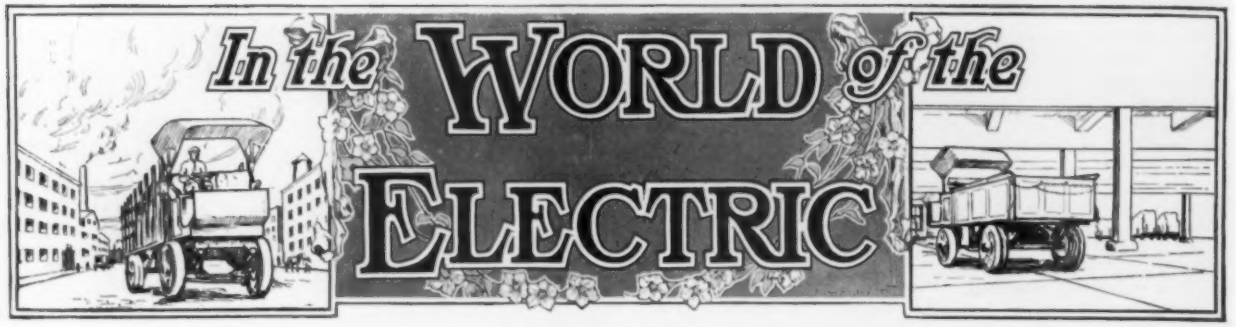
One large brewer who has tried a commercial car and found it highly satisfactory is Adolph Coors, of the Coors Brewing Company. He installed a Frayer-Miller 30-h. p., 1½-ton truck fourteen months ago, and states that it has not been out of commission a single day since. It covers a very large territory. This is divided into three districts, the car covering each of these twice a week and has never missed a trip because of weather conditions. The roads encountered on the north side are heart-breaking in muddy weather, even to a teamster with a fresh team, because of the deep, sticky clay encountered. Nevertheless, the machine has not yet been stalled in that district.

Unfortunately the company has not kept a careful, separate expense account, but is convinced there is a big saving in cost over the horse-drawn wagons. The commercial car drivers are paid no more than those on the wagons: $20 per week.

The Anheuser-Busch agency has had a two-ton Knox in use for about eight months and finds it very satisfactory. It handles easily the amount of goods that formerly taxed two wagons to take care of. The few troubles have been mostly due to tires.

The Capitol Brewing Company, about a year ago, made a trial with a second-hand motor truck, but gave it up, but Mr. Pfretzschner, the manager, states that they will make another trial as soon as a few minor details can be disposed of.

Of the Denver brewers who were interviewed, it seems to be the consensus of opinion that where it is possible to install a good make of commercial car and find a competent driver to manipulate it, there is a great economy in cost over the horse-drawn mode of delivery, not to mention the improvement in service and more satisfaction among the customers.



Walker Balance-Drive Commercial Car

BY WILLIAM J. JOHNSON

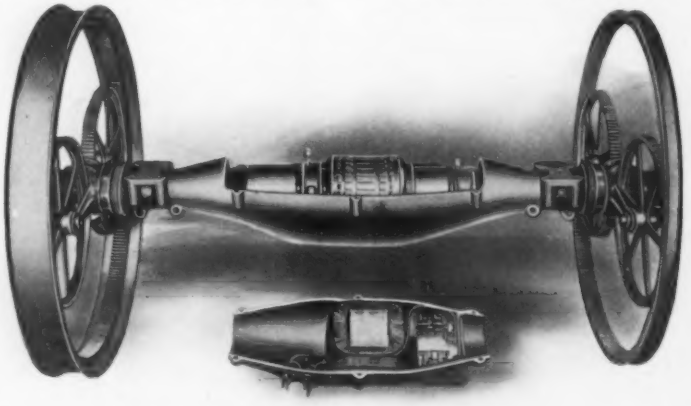
WALKER balance-drive electric commercial cars, manufactured by the Walker Vehicle Company of Chicago, Ill., are to be had in varying sizes of chasses from 750 to 7000 lbs. load capacity. The radius of action differs in each model according to the battery used.

The most conspicuous feature of this entire Walker construction is the unit system of balance drive, which is practically direct to the rear wheels and eliminating the usual array of gears, chains and the like. Bodies and batteries are as the customer orders and, when so specified, the larger cars will be equipped with electric winches, very useful devices on occasion, which materially simplify loading and unloading.

Walker balance-drive electric commercial cars have been on the market for several years, so that this improved system of drive has been thoroughly developed and claim is made that exceptionally good results have been and are being derived of cars already in service throughout the United States.

Unit Form of Drive

The most salient feature of this entire Walker construction is the unit system of balance-gear drive from whence the car derives the name. In Fig. 1 is shown the single motor in position in the rear axle housing, the cover plate removed and containing two of the motor fields.



Walker Balance-Gear Drive Unit
Assembly or unit driving construction, showing motor in position, with two idlers engaging with internal gear

Directly connected to this motor or prime mover is the bevel gear differential. The armature shaft is hollow and the alloy-steel driving shafts or floating axles are square on the inner ends where they seat in the differential. At the outer ends the shafts are equipped with alloy-steel spur pinions which mesh with the two large steel idler gears, these in turn meshing in the internal gear formed in the wheel rim. The face of pinions and idlers depends on the size of the car in which they are to be used. The spur pinions are firmly secured to the floating shafts, or drivers. Reference to the accompanying illustration shows the interesting construction. The armature shaft is supported in Hess-Bright annular ball bearings, which in turn are carried in cages secured to integral lugs of the rear axle housing. A large flange is formed at one end of the armature shaft and to this the bevel gear differential is bolted, gears and shafts being nickel steel, fully enclosed in an oiltight housing.

From the accompanying cut it will be noticed that the two large steel idlers mesh with the spur-driving pinion, tapered and keyed to the driving shaft. These large steel idlers are journaled upon roller bearings in a stationary double yoke, which is the rear axle stub upon which the wheels revolve, stub secured in the axle housing by a pinch and a locking bolt. The tendency of the yoke to revolve in the housing is overcome by a feather key. Wheels are easily removed by loosening two bolts.

The motion of the driving pinion is, of course, equally transmitted to the two large steel idler gears with which it is in mesh, and through this pair of large members the effort is transmitted to the rim of the wheel, or, as it may be termed, the internal gear ring, or rim gear. This large internal gear, clearly set forth in the accompanying illustrations, is made of rolled channel steel and is pressed into the rolled channel tire rim of the wheel, held between dished corrugated discs, thus protecting the driving mechanism from the elements. These discs also serve the same purpose as ordinary wood spokes in an artillery-type wheel. The inner of the pair of wheel discs is riveted to the tire rim, the outer is bolted to the inner member through the internal gear between the two discs. The outer member is easily removed by loosening the through locking bolts, which operation requires but very little time, the interior being then exposed to view.

Since the driving power is transmitted through the balanced idlers, which mesh with the rim gear, there is no especial stress on the corrugated cover wheel plates. Wheel bearings are Hess-Bright annular ball.

The brake drums for the external contracting sets are riveted to the wheel discs, bands being flexible-steel lined with a non-burning material. Location of brakes is such as to make for ease of adjustment.

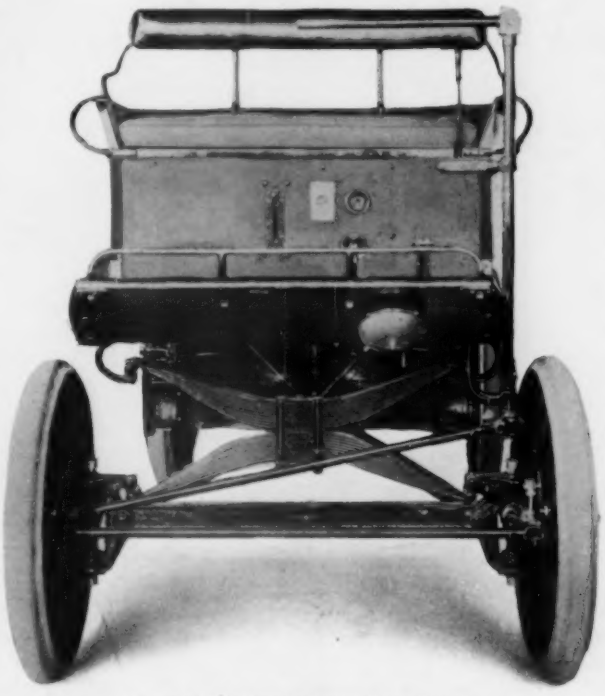
Motor

The motor equipment varies according to the model, and is a direct current instrument of proper voltage and amperage to fully meet the service requirements of the car in which it is used. The hollow armature shaft, as before mentioned, runs on Hess-Bright annular ball bearings. The pole pieces are bolted direct to the rear axle housing. A very desirable feature of the motor is that it is easily accessible. To remove the armature it is only necessary to withdraw the driving shafts, one of which passes through the hollow armature shaft; the cover plate may then be removed with two of the fields, as shown in the cut, and then and there is the unit exposed. Armature and differential are, of course, a unit and as such, removable.

Battery

In the Walker balance-gear drive electric commercial cars the battery is built according to the service demands. Standard equipment is the Exide type, though other well-known makes will be furnished at the purchaser's option, as, for instance, the Edison.

In the 1½ ton commercial car, Exide equipment consists of forty-two cells of eleven plates, arranged in six trays and disposed in the underslung battery box, which is carried between the front and rear axles. The battery box is suspended from the main frame through cradles built up of 2 x 2 T-steel, and the battery may be reached from inside the car by lifting a trap door in the floor. Doors are fitted at the sides of battery box, making for easy access.



Front of Walker Balance-Gear Truck
The arrangement of the springs is unique, consisting of two semi-elliptic springs placed as shown

Wheels

In the description of the rear axle driving unit the wheels were mentioned. The front members follow the same construction, excepting that, of course, they are devoid of the mechanism which forms a part of the rear wheels. On the 1½ ton car these front wheels, corrugated steel, disc type, are 36 in. in diameter and fitted with 3½ in. solid rubber tires. The rear wheels are 42 in. in diameter and are equipped with 3½ in. solid rubber tires.

Front wheel bearings are Timken roller type.

The wheel base, like battery equipment, is in accordance with the service requirements.

Front Axles

The front axle of the Walker balance-gear drive electric commercial car is a drop-forged steel member, I-beam section, steering yokes being forged integral. The steering knuckles are fitted with Timken roller bearings top and bottom, knuckles and wheel spindles being forged integral. The front axle also supports the front spring, since this is of the transverse order.

Triangular Brace

The front axle is braced by a triangular member formed of channel steel, the side members extending from the extremities of the front axle to a point on the under side of the battery box center, the side rods here terminating in a ball joint, which is lubricated by a grease cup. Through this triangular reach arrangement the front axle is strongly braced.

Frame

The frame on the Walker balance-gear drive electric commercial car is made of structural steel, dimensions being governed by the type and size of body to be fitted.

Wheel or Lever Steering

The purchaser has the option of lever or wheel steering, in either case the car being controlled from the left side, which is generally regarded as best for city service. When wheel steer is the equipment, the vertical post is supported in a conical iron casting, which is bolted to the frame. The cross connection is employed with the usual provision for adjustment.

Springs

All Walker springs are made of vanadium steel, rear members being of the three-quarter platform type. The transverse member of this set is secured amidships to a drop-steel member anchored to the frame, such disposition tending to lower the spring center at this point materially.

Side members of the rear set are permitted to oscillate on the rear axle spring seats, retention of seats being through the usual type of steel clips. Forward the side members are anchored to steel brackets, or hangers, which are secured to the frame, the center here also being brought as low as possible. All spring leaves are ribbed so that there is no possibility of side play.

Front springs are of the opposed elliptic order, the top and bottom sets being center anchored to each other; lower half ends secured to the integral lugs of the front axle. The extremities of the upper sections are secured to drop forgings, which are in turn anchored to the frame. The triangular reach, attached to the front axle and already described, accounts for stress imposed at this point.

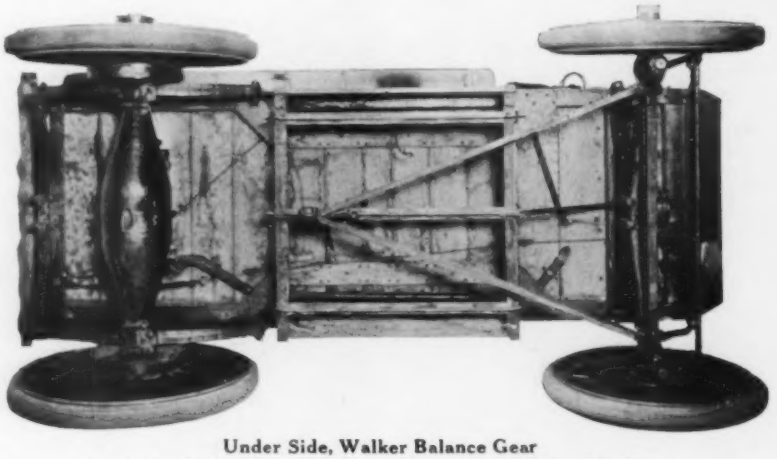
Brakes

There are two contracting brakes on the rear wheel drums as previously mentioned, operation of these being

through a conventional foot pedal. These brakes are sufficiently large to check the speed of the car quickly.

Control

There is no departure from the usual method of control in the Walker balance-gear drive electrics. Steering, as mentioned above, is through a conventional hand side lever or a steering wheel, just as the purchaser desires; brakes are set through a foot pedal. The controller is of the drum type and is located under the driver's seat, affording four or more speeds ahead and reverse. Reverse is brought into action by pressing downward on a small lever which projects through the heel board.



Under Side, Walker Balance Gear

Attention is called to the clean under side, all parts being protected. Note the unit rear axle and triangular reach

An ampere-hour meter is furnished, and the driver knows at a glance the status of the batteries. Wheel base, as before stated, depends on the service for which the car is to be used. All Walker cars will turn in a twenty-five foot circle so that they may easily be operated on the ordinary city streets.

The radius of a single battery charge depends pretty much on the make up and type of that battery and the rate of discharge.

With the drive in the rear wheels fully protected and running in oil, it is claimed that even after long service there is no perceptible wear on either the pinions or idlers, which take on, instead, a mirror-like polish. Even the replacement of these members is not costly.

The price of Walker cars varies according to the type and body, battery equipment, and the like.

GAS-ELECTRIC CARS

An inroad is being made on trolley traffic operations and equipment by the steady introduction in many parts of the country of the gas-electric cars, which need no external power conductors. The General Electric Company is forward in this mode of propulsion, and it is being demonstrated on many branches of steam roads in this country. The argument is: "The application is simple—a line of rails, one man in the cab and a conductor bring fast schedules—perfect safety and comfort, with the simplicity of a trolley car. The operating expense is low—around twenty cents per car mile, including fuel, wages, supplies, maintenance, depreciation and interest on investment."

A complete eight-wheel car carries ninety-seven passengers and includes baggage, smoker and passenger accommodations, with observation room at the rear end. In the front end is a gasoline engine operating a generator in full sight of the operator, who governs the speed by a controller connected by electric cables to the motor trucks on the axles, and the electric current keeps the headlight bright, the rear light glowing through its red glass and brilliantly illuminates the car.

HORSES DIE FROM HEAT

"Over 1200 horses died from the heat in New York City during the eleven days of the recent hot spell," said Harry S. Houpt, manager of the sales of the American Locomotive Company.

"A well-known packing concern suffered a loss of $70,000 in horse flesh throughout the country, while another large organization met with a loss of $40,000.

"Estimating that draft horses are worth $250 apiece, the total loss in horseflesh in New York City would have been $300,000, while the loss throughout the country doubtless reached over a million dollars.

"Aside from sentiment this situation offers a mighty good argument for the motor truck. I doubt if there was a truck in New York City affected by the heat sufficiently to put it out of service."

At last the American electric commercial car has reached far away Sweden. The Studebaker Company, at South Bend, Ind., reports the sale of a 7000 lb. electric commercial car to Krakau's Ingeniorbyra of Malmo, Sweden. Just what use is to be made of the car is not stated, the order having been secured through the New York office. In compliance with the Swedish laws the tires are extra wide, 4 in. dual front, 5 in. dual rear.

EVEN THE STAGE COACH, typical of early California days, is giving way to the onward march of progress. The last to succumb was the Bradley-Pleyto run, 32 miles, requiring six horses. A Buick commercial car, with less time and expense, averaging 1200 lbs. per day freight, is now covering the route.

New York—A Field for the Electric Commercial Car

BY HARVEY ROBINSON

THE Borough of Manhattan, of the City of New York, situated as it is on a narrow island, about fifteen miles in length, is an ideal field for the use of the electric vehicle. Facts bear out this statement, for almost every business having a delivery department of any size whatever uses electric cars within this fifteen-mile territory. Beyond that limit the transportation managers favor the gasoline car.

Figures do not show the exact number of electrics in New York now, but the usages to which they are put cover everything outside of the fire department. Even that exception bids fair to be removed in the near future, for it was recently decided to install a large automobile equipment in the department. There is hardly a doubt that a number of electrics will be provided for when the appropriation is voted. Fire Commissioner Johnson, who decided on this sweeping change, has appointed a special board, consisting of one of his deputies and a number of the department chiefs, to consider the merits of the different types of cars.

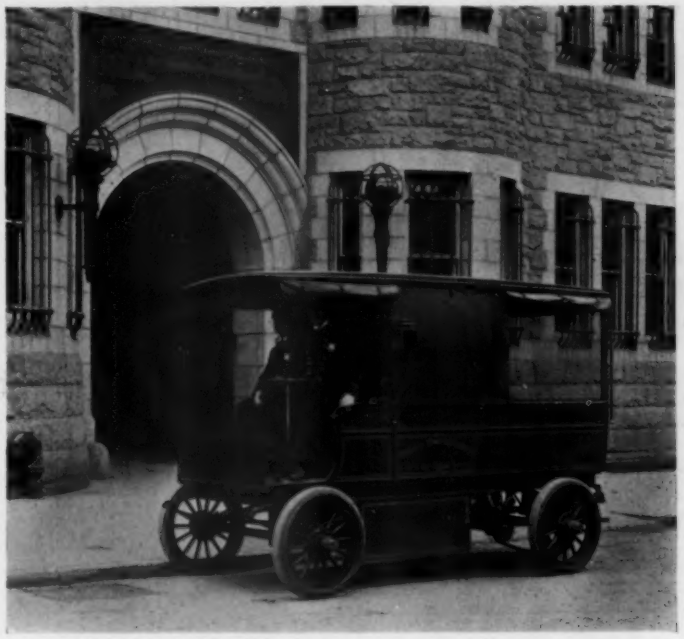


Photo by N. Y. Edison Co.

The tenderloin precinct is the busiest in the city. The patrol has been in service here for three and one-half years

New York seldom, if ever, is hasty in adopting revolutionary methods of conducting her municipal affairs. So it is with anything that would upset the old order of things. Some other city or town must first demonstrate the worth of the new institution. Then in the course of a few years, if it has met the tests, Father Knickerbocker will adopt it for his own, and will exploit it to the limit of its possibilities.

So it has been with the fire department. The commissioners, and all others who have had the matter under advisement, have exhibited a true metropolitan skepticism toward the introduction of so revolutionary a change. They feared a multitude of things might go wrong, but at last decided that the faithful old horse, while more picturesque on his run to the fire, was hardly speedy enough to meet the needs of so great a city as New York. They have tried out the gasoline vehicle, having in service an engine and a hook-and-ladder truck.

As to the serviceability of the electric fire engine, they have depended upon reports from European cities, and the only city in this country which has electric apparatus in actual and satisfactory service since last March, is the Springfield, Mass., fire department which has had, as part of its regular equipment, an electric truck and a gasoline-electric combination hose and chemical wagon. The truck, an eighty-five foot vehicle, carries 325 feet of ladders, a crew of seven men and has a speed of twenty miles an hour. It climbed a twelve per cent. grade at the rate of eight miles an hour. Four 3 h.p. motors are mounted in the wheels. They secure their energy from a battery consisting of eighty cells. The combination wagon is fitted with a forty-gallon chemical tank and carries, in addition, a thousand feet of 2½ in. hose. It has a guaranteed speed of thirty miles an hour. The trucks are housed in the fire-department headquarters, in the business part of the city, and have responded to every call without an instant's delay. The electric car in Springfield proves its worth against a most active campaign of the gasoline interests. In providing for the apparatus the city is building a garage fitted with the latest improvements for the care of electric vehicles.

An Electric Patrol Wagon

While the New York fire department is still considering the merits of the electric, the police department is receiving daily demonstrations of their worth. For the past three and a half years an electric patrol, built by the General Vehicle Company, has rendered most efficient service. Stationed in the tenderloin precinct, the busiest in the city, it receives more calls than any other patrol wagon. Daily it has met the demands made upon it, with never a delay. It carries the reserves to burning buildings, the unknown dead to the station house, the prisoners to the courts and, as an auxiliary to the ambulance service, has carried the injured to the hospitals. At the periodic raids on resorts in the district it has often made as many as three or four trips, bringing all the prisoners in, and later in the same night has conveyed them all to the Night Court. Under ordinary conditions, the patrol makes the rounds of several adjoining precincts each night, and takes the prisoners from each to the court. This does away with the necessity of each precinct bringing out its regular patrol wagon.

For Hospital Service

Several of the private hospitals of the city have been using electric vehicles for many years in their regular emergency service. The New York Hospital, which has one of the busiest ambulance services in the city, has added to

its fleet of electrics on several occasions. The Department of Charities, which controls the hospitals maintained by the city, has installed several electric ambulances, and only last month added another to its equipment, assigning the vehicle to the Harlem Hospital. It is the intention of the Ambulance Board to gradually replace all the horse-drawn vehicles, but, of course, the process will be slow.

The Storage Battery for Street Car Service

The storage battery has become a dominant factor in the management of the city transportation company's problems. The Third Avenue Railroad, operating an elevated line and an extensive system of street railways, is using storage-battery cars on three of its street lines, for its emergency service, and expects to equip other lines before the winter. The Twenty-eighth and Twenty-ninth Street Cross-town Line, operating eastward on one street and westward on the other, uses storage-battery cars exclusively. The One Hundred and Tenth Street Line, in Harlem, is similarly equipped, and in a short time the Avenue B Line, now operated by horses, will have storage-battery cars.

The companies which operate a belt line and some of the crosstown lines have hesitated at taking off their horses, because the lines, they say, are operated at a loss now, and there is no reason why an additional outlay should be made.

The emergency department of the Third Avenue Railroad has three two-ton trucks, each carrying a complete repair outfit. These cars are called out at all hours of the day and night to mend the breakdowns which so frequently occur on a road covering so many miles.

Photo by N. Y. Edison Co.

Hoisting a Five-Ton Safe by Means of an Electric Winch on a Five-Ton Electric Truck. Power is supplied from the truck battery

Delivery Fleets of the Department Stores

Hardly a department store, no matter how small, is without at least one electric in its delivery department. The larger stores maintain whole fleets, ranging in size from the small wagons to the great five-ton trucks. The smaller vehicles are used for making the regular deliveries, while the trucks are used for carting cases from the warehouses and in delivering furniture and heavy stuff to the customers. It has been the experience of the managers of the various delivery departments that runs within a radius of fifteen miles should be made with the electric, while outside that limit the more speedy gasoline car is favored.

Largest Electric Vehicle Fleet in the World

Probably the largest electric vehicle fleet in the world is that of the Ward Baking Company. They are now operating one hundred and fifty cars in New York, and on September 1st, of the present year, will increase the number to a total of two hundred.

The next largest user of electrics would seem to be The New York Edison Company, with a total of ninety-five. Gimbel Brothers, of New York, come next, with eighty. Altman & Company are among the oldest users of the electric in New York, having installed their first cars more than ten years ago. They are closely followed by Tiffany & Company, jewelers. Among the wholesale merchants, the firm of H. B. Claflin & Company was among the first to adopt the electric. Their fleet consists largely of the heavier trucks, because their shipments are made in larger quantities.

There are few businesses in New York whose needs demand more than one or two sizes of vehicles. The dry goods stores and retail merchants require cars of the smaller capacity, while the wholesale houses and manufacturers use the heavier trucks.

Electric Trucks in the Light and Power Industry

In the electric lighting industry more cars and of greater variety are used than in any other. The New York Edison Company, whose current is used from the Battery to Yonkers, has in its service seventy-five commercial cars and twenty passenger cars.

The passenger cars are of several makes and sizes, and are used by the officers and outside men of the companies on their rounds of business visits. The commercial cars range all the way from the 700 lb. wagon to the five-ton truck. Twenty of the 1000 lb. wagons are used by the lamp department for making their deliveries. They work over regular routes, and each does work equivalent to that of two horse-drawn wagons. Certain wagons are fitted up especially to carry the tungsten lamps, which are easily broken if subjected to any jar. These wagons are fitted with padded floors and other shock-absorbing devices. All wagons are fitted with an automatic device which records on a tape of paper the date, the time of starting and finishing the trip, the mileage covered, the number of stops made and the time of each, and speeds at which the car has been operated.

The one-ton wagons, twenty-three in number, are used in the underground and wiring department, and for miscellaneous work. One of them is fitted with a tower, from which the lamp tender works when he trims the arc lights along the city streets. Two of the wagons, fitted with all kinds of repair tools and a large emergency outfit, are kept ready to respond at an instant's call in case anything goes wrong at any part of the city. A two-ton truck is used in the

Photo by N. Y. Edison Co.

Latest Addition to New York Ambulance Service. Delivered to the hospital on July 12th

transportation department and four three-ton trucks are used in the arc-lamp department. They not only carry the lamps, carbons and fixtures, but are fitted with derricks, by means of which the poles are hoisted from the street and set in place. Poles weighing from seventeen hundred to eighteen hundred pounds are handled without difficulty. Equipped with a double derrick, they are used in lowering heavy transformers into manholes.

Five-ton trucks are used for the heaviest work of the lighting companies. They are all equipped with powerful winches and are capable of handling the great reels of subway conduit, vast quantities of stores, and are used for drawing cable through the conduits.

The garage of the Edison Company is centrally located, and here, when the vehicles lay up for the night, they are connected with the charging board and made ready for the next day's service.

The United Electric Light and Power Company, which operates in the upper part of the city, uses, in addition to its passenger cars, thirteen commercial vehicles. Seven are used in the lamp department and the balance are of larger capacity and are used by the distributing department.

Electric Baggage Trucks

Railroad companies and steamship lines are rapidly and gladly adopting electric trucks in the transportation of baggage at terminals and piers.

The Pennsylvania Railroad Company, the New York Central, the Erie, and the Hamburg-American Steamship Line, are among the users.

Most of the baggage trucks are equipped with a control at either end, so that the truck, when piled high with trunks and bags, may be operated in either direction on train platforms.

It must be said for the electric vehicle that while the mileage may now be limited, the same is not true of its possibilities.

LONG RUN ON ONE CHARGE

Carrying a 1,200-lb. load and two men, a one-ton Detroit Electric recently made the trip from Washington to Baltimore and return, a distance of 79 miles, on one charge. The trip took 8 hours 10 minutes, and at the end the reading of the ampere hour meter indicated that the car was still good for several miles.

The roads were, in the main, good, and the maximum speed of 12 m. p. h. was maintained most of the way, even greater speed being attained on down grades. No mechanical trouble of any kind was experienced.

LOUISVILLE COMPANY BUILDING ELECTRICS

The manufacture of electric commercial cars has been begun by the Electric Vehicle Company, of Louisville, Ky., which intends to market vehicles of 600 lbs. and 1,000 lbs. load capacity, respectively. The present capacity is about one hundred vehicles a year. The design of the vehicles is along standard lines and the builders announce that the materials and workmanship will be the best obtainable.

The 600-lb. wagon will be equipped with a lead battery of 30 cells, G. E. motor, with drive to countershaft by silent chain and final drive to the rear wheels by roller chains. Tires will be 34 x 2½ in., Diamond side-wire. The 1,000-lb. vehicle will be equipped with Edison battery of 50 cells and similar type of transmission system. The wheel base and tread of both vehicles will be the same, 86 in. and 56 in., respectively. The standard body will be of the panel delivery type, with dimensions in the larger vehicle of 73 in. in length, 63 in. in height and 42 in. in width.

THREE-WHEELED ELECTRICS IN BERLIN

Berlin uses three-wheeled electrics extensively in delivery and passenger service, and also in postal and fire work. They have twenty-cell batteries with a radius of fifty miles, and have a maximum speed of 15½ m. p. h.

WILL BUILD FOUR-TON TRUCK

Announcement is made that the Anderson Electric Car Company, of Detroit, Mich., will build a four-ton electric commercial car to follow the same general lines as the cars now built. The model car has been on the road for some time.

How Would You Have Your Business Go, Like the Snail or the Hare?

ELECTRIC COMMERCIAL CAR MAKES RECORD

A one-ton Detroit electric delivery car established a new record for freight-carrying motor vehicles, when it covered the round trip from Washington to Baltimore, Md., in eight hours and ten minutes actual running time; actual distance covered being 79 miles. The car carried a load of 1000 lbs. and two men. The run was made on one charge of the battery, and at the end of the run the ampere hour meter showed that the machine could have been driven several more miles before the battery would have been exhausted. The car was driven by Bruce Emerson, of Emerson & Orme's salesroom, 1407 H Street, northeast, Washington agents for the Detroit. Editors of four newspapers went along as reserves and alternated in riding in the truck. The actual cost of the trip was figured to somewhat around seven dollars.

ELECTRICS FOR PHILIPPINES

The Bureau of Insular Affairs at Washington has placed an order with the General Vehicle Company, of New York City, for fifteen large trucks for service in the Philippines. This is the fourth order placed with this same manufacturer for electric trucks in the Philippines, which the company regards as an especial complimentary testimonial from the department. It is understood that the trucks, which are of various sizes, but mostly heavy ones, will be used in the ice and refrigerating enterprises of the Government at Manilla.

CAMPAIGN TO EDUCATE THE STORAGE-BATTERY USER

The fact that the storage battery may be mistreated without any very evident protest, though one of its great advantages, is also a disadvantage in that inexperienced users may unknowingly so abuse a battery as to lose much of its efficiency, and so not realize its full value. It is with the object of aiding every user to obtain the maximum service from his equipment that the storage battery and electric vehicle makers have started on an educational campaign. The results have shown that storage batteries have increased in efficiency on an average of 33⅓%.

Since the introduction, in Philadelphia, Pa., of the S. P. C. A. electric water wagon for watering horses, inquiries have been received from New York, Boston, Baltimore, Chicago and London in regard to the machine, with a view to installing similar wagons in these cities. The society in Philadelphia reports that over eight hundred horses have been watered in a single day and that for facility of handling and the work which it accomplishes it is much better than a horse wagon would have been and has far exceeded their expectations.

An unusual performance for an electric automobile is that of thawing out frozen pipes in residence communities. Such, however, is the use which certain electric supply companies are making of their vehicles. A large current of low voltage is supplied by a generator on the car. Connections are made to the frozen pipe and to the outside water pipe so that the current flows through the pipe, heating it sufficiently to allow the water to pass the frozen part.

THE WAVERLY MAINTENANCE CONTRACT

An illustration of caring for the purchaser after he secures his car is shown in the case of the Waverly Company, of Indianapolis, Ind., makers of the Waverly line of electric commercial cars. To eliminate the uncertainties attending efforts to compute maintenance costs the Waverly "Maintenance Contract" is offered to users of the Waverly cars. Many of the Waverly dealers throughout the United States are prepared to offer this service to their patrons. The contract, a copy of which is shown herewith, covers the entire cost of maintaining the car, charging and storing,

MAINTENANCE CONTRACT

_____ 191 _____

It is further understood and agreed that _____ will store the above car, attend to the washing of same, charging same to meet your requirements and keep wagon in good repair in every respect, repairing tires or furnishing and putting on new tires, maintain the batteries, washing and renewing same when necessary, for the sum of $ _____ per month, provided such repairs are not the result of accident or neglect.

The above maintenance charge not to include repainting. This contract to cover a period of three years from date of delivery, with the understanding that _____ is to have the benefit of any reduction in the upkeep charges on same type of car during the life of this contract.

At the termination of this contract the wagon is to be in good operating condition.

Signed _____

operation, painting and repairs due to accidents, but not, of course, the driver's wages. It includes, in addition, a maintenance guarantee for three years,—a guarantee that the car shall be in good operating condition at the expiration of that time.

Terms of the contract of course vary according to the locality and model, for in some cities current is to be had cheaper than in others, but the charges are based on the lowest rates possible for current, garage rent and labor. This form of contract is especially intended for the man who has no garage and to a great extent, under the circumstances, simplifies the matter materially.

J. Crawford Bartlett, of Philadelphia, Pa., well known for his connection with the Woods Electric agency in that city, has just taken on the agency for the Mais truck.

The Murphy Power Company, of Detroit, Mich., is to open a garage devoted exclusively to electric commercial cars.

L. W. Kellogg & Son, of Detroit, Mich., have the agency for the Detroit electric commercial car. The present offices of the new concern are located at 10550 Euclid Ave., and is being operated as a factory branch of the Detroit concern.

The United States Government has found it economical to use motor electric vehicles for the distribution of distilled water and ice in the Philippines. The government is using the General Vehicle Company's one-ton express type electric wagons.

NEW FREIGHT DEPOT TO HAVE GARAGE

The Electric Package Company, of Cleveland, O., is planning a new fireproof freight depot on Bolivar road. The building will be 287 ft. long and extend to Eagle Avenue.

The entire basement will be used for the accommodation of express delivery automobiles, and will be approached by an incline driveway at each end. Platforms along the sides of the building will be at the height of the express car doors.

How About the Man at the Wheel?

Regulation of Drivers

BY WILLIAM J. JOHNSON

OW about the man at the wheel of your car? Is he capable? Does he safeguard your interests? Is he willing to work thirty minutes overtime? Is he common-sensed? Can he make a simple roadside repair, or get home on one chain without calling up for help and trouble wagon, and has he due regard for your car and tires? If not, he is not the man for you, for he is not serving your best interests, and sooner or later he will prove a costly proposition. He is one of that large class that makes imperative the need of close regulation.

Drivers Classified

Drivers may be regarded as representatives of several classes. To begin with, there is the thoroughly practical man who can do anything himself if you but provide him the equipment; who knows his car like a book, and as a piece of mechanism takes pride in its performances and sees to it that it is always up to the mark. He is well worth consideration, especially by the uninitiated user, as he can prove of great help in the selection and use of cars, for, being a practical man, he knows what to do and what not to do. He is worth good money and will prove a good investment.

Then there is the common-sensed plodder, so to speak, not a technical man, but possessed of brains and the ability to use them. With proper initial instruction he will prove a good man, will consider his employer and the money represented in the car of which he is the driver. He is anxious to learn his car, and with a fair chance will do so. He can be relied upon to be as easy as possible on his car, will not speed unnecessarily, and, if he does have trouble at the roadside he will call into play his knowledge gained through initial instruction. He is worth a good week's wage, for he is careful and conscientious.

There is another class that is not worth consideration, the know-it-alls. They have knocked around here and there, gained a little experience, but by reason of the fact that they cannot be told anything, are practically useless. There is no need to dwell further upon this aggregation. In the long run they spell disaster and dissatisfaction.

Then there is that class that get at the wheels of cars one way or another, when they should, as a matter of fact, be shoveling coal, for little tact is required at that. They have no regard for the car, do not consider that the vehicle represents a good-sized investment, and are not at all careful as to how they operate. This class materially swells the income of the repairmen and the owner has to foot the bills.

Uninitiated Users Most Affected

The uninitiated users of commercial cars are those most seriously affected by the inefficient sort. Assume that a promising individual shows up bright and early in the morning and wants a position and one is open. He is asked to give a demonstration of his fitness and he climbs onto the seat and operates the car in the back yard or up and down the street, where the owner can observe the performance. To all appearances he is the man for the place and he gets it. But, is he the man for the place? Once out of sight of headquarters, he cuts loose and he is going to finish things up at pleasure car speed. An illustration of this type is afforded by a Middle Western service: Several cars are in use, both gasoline and electric. Of all the drivers, one man seemed to be in trouble pretty much all the time, and the repairs for his car were heavier than any of the others doing the same class of work. The manager of the garage happened to be uptown one day, and observed the driver racing the car. A closer watch resulted. The driver never favored the car in descending a grade, he usually let the motor out to the limit, which is one reason that repair bills for that particular car were heavy. Now he is looking for another berth.

When the uninitiated user has just entered the field of commercial car use he has much to contend with. He may make a mistake in the selection of his car, he may be using a three-ton truck when a one-ton would answer the purpose very nicely. He knows little about drivers and cars and is pretty apt to be the victim of circumstances for a while until he sees just how things are going. If he secures a thoroughly competent man he will have smooth sailing; if he gets one of the other sort he is sure to have trouble. It is simply another illustration that experience is a great teacher, and he will know more six months after installing his cars than he did at the outset.

Regulation of Drivers

It is obvious that there must be some means of regulating drivers. In those services where cars have been used for some time the problem has been fairly well met. After a certain period of operation there was available some definite data upon which to work, and if a car showed up unduly heavy in the way of fuel, oil, and repairs for a given time, it was generally conceded that the driver was at fault; called to account, things very likely improved in the next period of operation.

The largest users in New York City have a close method of caring for drivers. It was imperative that there be; the need was early recognized, and, all things considered, service is better to-day than formerly.

What method of regulation of drivers should be put into force where none has previously existed? This phase brings one back to the inevitable starting point, "solid system." In such services where there are many cars in use it is essential that a competent man have charge of the fleet. A private garage will best serve the purpose, then with private equipment it is possible to do things right, know what they cost, and the like. The garage manager, with an adequate office file of stock, equipment, cars, drivers, fuel consumption, repairs, and the like, knows where he stands; he has something to work on. With each car assigned to a given driver, the work of that car recorded day to day, as to tonnage carried, number of stops, fuel consumption, repairs, trouble on the road and the cause of it, and so on, the operation record is complete; with due attention to tires, it is known definitely how long a given set is serviceable. The garage manager then has on hand all the desired information, and from experience he knows whether or not he has the right man on each car. This, in

a nutshell, is the system of regulation that has worked out successfully with the pioneer users of cars, and the uninitiated can follow in the same track and avoid a lot of trouble.

Keeping Tab on the Driver

It is customary with the oldest users of cars to keep tab on drivers, and when a prospective driver approaches the garage manager in quest of employment he is usually put through the third degree. What experience has he had; for whom did he last work; reason for leaving; where else employed; wages received; habits,—and the like. The garage manager, having occasional need of men, will take the trouble to look up the man and verify his statements. To

DRIVER'S RECORD

Name_____ Car No. (or Name)_____
State License No._____
Previous Employer_____
Cause of Leaving_____ Wages Paid_____
What Other Experience_____
On Probation, Date_____
Regular, Date_____
Remarks_____

Fig. 1. A Simple Method of Recording Facts About Drivers. An ordinary 3 x 5 card will answer the purpose. This can be incorporated with the card record.

say the least, the desired information will not be difficult to obtain. If the man's statements are correct, if he has a clean bill, so to speak, he is worth keeping in mind; if not, that ends the matter.

Period of Probation

The uninitiated user will doubtless find it to his advantage to take drivers who appear to be worth while on the list for a probationary term, just as men are taken in public service. This has a tendency to develop a better set of drivers in general. The sooner the majority of users get down to this principle the sooner may be expected a better class of availiabe recruits. When a man with a little common sense is put on probation he knows that it behooves him to make good; if he is the right sort he will fill the bill.

Adequate Instruction

Thorough instruction will do a great deal towards the betterment of service. If it is observed that a driver is not getting the results out of a car, that repair bills are high, and investigation shows that he is at fault, point out that fault; meet him half way and the chances are that he will do better. An occasional gathering of drivers for the purpose of a little schooling will prove beneficial to all concerned. In the larger services, garage managers, as a rule, hold their positions by reason of their all-around practical experience; they are in a poistion to impart knowledge of care and operation to drivers which will better the service.

Low-Priced Men Poor Economy

It is poor economy to employ low-priced men, not that it is to be implied that every low-paid driver is a poor man. But there must be some incentive for the driver. In a sense, the commercial car situation has much in common with the pleasure car, there are those users who want a man to work for almost nothing and hustle all the freight. It is well to start in with the belief that the laborer is worthy of his hire; if he is not, he will soon prove it himself. Because a teamster can be broken in to operate a car in a short time and do the work for much less than an all-around man, does not mean that the teamster is the man for the place. Choose the man who "knows."

Advantages of Factory Schooling

Makers of cars are doing much to settle the matter by schooling the drivers, a practice which is becoming more general. It is usual, when a man buys a commercial car, to have the driver selected come to the factory and spend a week or two in practical schooling. This has worked out well and makes for more satisfactory service.

It is preferable to have the driver fully understand the construction; why, when he does this or that, a given result follows. It is better that he should know thoroughly why an engine heats up; why there is a knock on a long hill; why gasoline is the basis of power; why the exhaust is too smoky when he is using too much oil; to differentiate between a valve tappet slap and a connecting-rod knock.

One successful and satisfied user of a three-ton truck, in discussing his service, stated that he considered it only due himself and the man he hired to run the car, to have that driver take a course of instruction at the factory. The man was there two weeks and he paid him during the instruction. The service is good, the driver trained.

It is not, of course, necessary to send a driver to a factory school. He can acquire the knowledge at the garage under proper conditions.

Good Vision Essential

Doubtless the need of clear vision has escaped many users of cars. The necessity of such is borne out by an Eastern service. The driver, not long ago, was coming down a grade and struck a bicycle rider, who was injured. The police investigated and ascertained that the driver could not see very far ahead. The case passed along to the secretary of state, and the probability is that the man will never again operate a car, as he will not be eligible for a license.

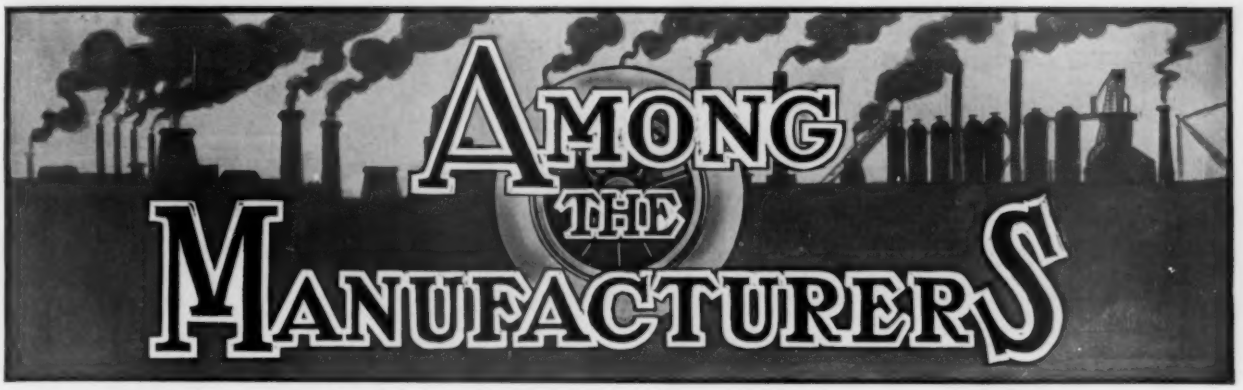
Difference of Opinion

There is a difference of opinion among users of cars regarding drivers. There are many cases of record where teamsters have been promoted to car drivers and have done very nicely. This is largely accounted for by the relations existing between the employer and the men who have been on the payrolls for years. In short, they are sensible, clear-headed, loyal and conservative, not prone to taking chances with their employers' equipment. Thoroughly instructed to begin with, they have done well.

There are others who would not employ any but experienced men and are willing to pay for the service, and pay well. In such cases known to the writer the employers express themselves as well satisfied. Their argument is, "Why intrust a three thousand dollar machine with a man who does not know?"

For the benefit of those beginning commercial car service the suggested card, shown in the accompanying illustration, will prove helpful in keeping track of the drivers. Knowledge of the driver is just as essential as that of the car.

A suggested system of car record has already been published in the COMMERCIAL CAR JOURNAL. The driver's record could easily be incorporated with this.



NATIONAL MOTOR TRUCK COMPANY

The officers of the National Cycle Company, of Bay City, Mich., for years one of the leading manufacturing companies in the country, have organized the National Motor Truck Company, and will, by November, begin the building of one-ton delivery cars. Later, heavier commercial cars will be manufactured.

The company has acquired six acres adjacent to the National Cycle Company plant, and recently began the removal of houses from the property. The first buildings, three in number, will be completed by October 15. The company will employ 750 men at the start, and increase this number when the manufacture of the heavier machines is taken up.

MOTOR CONVEYANCE COMPANY BUILDS COMMERCIAL CARS

The Motor Conveyance Company, of Milwaukee, Wis., recently finished its first commercial car and will run the same on a 485 mile trip to Cleveland under its own power.

The car is rated at six tons capacity and is powered by a 65 h. p. motor. The motor is fitted with a regulator which makes it impossible to drive the car at a speed of more than twelve m. p. h. The machine costs $6000 and is guaranteed for a year. It has been sold to Dusbin and Burke, general contractors, Cleveland, O. It will be used for hauling 5000 tons of brick over a road 13 miles long with a 9 3-10 per cent. grade. On this truck the radiator is not exposed and a large fan, concealed at the bottom of the engine, blows heated air through a shaft which opens back of the driver.

NEW PACKERS TRUCK ON STREET

The Packers Automobile Truck Company, of Wheeling, W. Va., recently turned out its first commercial car. The machine is powered by a four cylinder 30 h. p. motor. The frame is of pressed steel. Hele-Shaw clutch, Cotta transmission, double chain drive and Splitdorf dual ignition system are some of the features. By fall the company expects to turn out one complete truck every day. The officers of the company are: Albert M. Schenk, president; Albert F. Schenk, vice-president; W. F. Shafer, secretary-treasurer and Charles H. Smith, superintendent.

The stock of the Robinson Fire Apparatus Company, of St. Louis, Mo., has been increased from $130,000 to $250,000. An enlargement of the plant is contemplated.

McCUE GETS A WESTERN FACTORY

The McCue Company, of Hartford, Conn., has recently consolidated with the Superior Axle and Forge Company, thus giving the McCue Company a western factory as well as additional facilities and equipment to take care of its greatly increased business. The McCue Company will take over both factories and will manufacture axles for commercial cars, I-beam axle forgings, steering knuckles and steering arms. C. T. McCue is president and general manager of the new concern; J. W. Lansing, vice-president and treasurer, B. H. Bean, secretary and H. T. Doll, assistant secretary and treasurer.

TWO NEW SIZES OF ALCO COMMERCIAL CARS

In order to give its customers a representative line of commercial cars to choose from, the American Locomotive Company, New York City, has recently added to its line two new machines, namely, a 2½ and a six-ton size.

Up to the present time the American Company has built trucks in two sizes— a five-ton and a three-ton. The new sizes have been designed to complete its line of trucks, thus giving a range from 2 tons to 6½ tons in four models.

NEW COMMERCIAL CAR MANUFACTURER FOR DETROIT

The Banta Motor Truck Company, of Detroit, Mich., capitalized at $100,000, has recently filed articles of incorporation with the secretary of state. The concern will manufacture a $700 commercial car. The stockholders are: Jacob M. Stoerkel, George D. Banta, Hiram H. Stalker and Daniel P. Cassidy. Although the company has not yet selected a site, it expects to be in operation within sixty days.

DETROIT ELECTRIC ADDITION

A two-story addition is now in progress at the plant of the Anderson Electric Car Company at Detroit, Mich., builders of the Detroit electric commercial cars. The addition is to be in brick, concrete and steel fire-proofed throughout, and when completed the floor space of the factory will have been increased to such an extent as to cover 12 acres of ground.

The Webb Motor Fire Apparatus Company, of St.. Louis, Mo., has developed a piston pumping fire engine which is said to be very efficient.

INSTRUCTIVE EXPERIENCES

AUTO TRUCKS FOR ARMY

General T. H. Bliss, United States Army, who has been in command of the provisional brigade at San Diego, Cal., has made a report of the test of a two-ton commercial car purchased originally for use with the experimental rolling kitchen of the subsistence department, that indicates striking efficiency. The hauling capacity of the vehicle is 4400 lbs., and during its service it handled nearly 500 tons of subsistence stores and property, in addition to large quantities of beef, vegetables and flour, estimated at 250 tons.

The report shows statistics concerning comparative cost of maintenance. The difference in first cost between the commercial car and three escort wagons, the latter with twelve mules, including harness, is $664. The difference in cost of operation for 93 days is $372, both instances in favor of the commercial car.

"From a military standpoint of view," says General Bliss, "the advantage arising from shortening the line of march, from the absence of horses, from the ability to send the trains on long detours, thus insuring their safety and at the same time with the certainty of their being on hand when wanted, are obvious. In my opinion the time has come for the adoption of a commercial car specially designed for military service and its gradual substitution for the greater part of the work now done by escort wagons."

MAKES GOOD USE OF CAR

L. C. Delagrange, a Fort Wayne contractor, has found his Fort Wayne commercial car to be most useful on out-of-town work. For some time past he has been actively engaged at Rome City, about 38 miles from Fort Wayne. The roads en route are none too good, being hilly and sandy in spots. The contractor nevertheless loads up the car with materials and transports them to the scene of operations. This trip is made about three times a week.

USING COMMERCIAL CAR TO SHIP BANANAS

The Kissel Motor Car Company, of Hartford, Wis., recently sent one of its three-ton machines to Jamaica together with a chauffeur and an agent of the company. The car was used for hauling bananas by a prominent fruit exporting company, carrying heavy loads from the plantations to the wharves. The company stated that it is invaluable, as the bananas arrive at the ships in better time and in better condition than when the old horse transportation was used, and that they can now handle rush shipments, which they could not touch before.

The enterprise of the Kissel people in sending an agent and chauffeur to the scene to insure that their machine would be operated to its best advantage has been well repaid, as orders for several other machines have been received.

MOVING DAY WITH A COMMERCIAL CAR

By using a commercial car a Chicago family had its household goods moved a distance of 52 miles overland in seven hours, and the vehicle, after being unloaded, made the trip back to the starting place the same day.

This feat was performed by Sweeney Brothers, of Chicago, owners of a four-ton Sampson freight motor. Before seeking out this company the head of the house looked into the possibilities of transferring his goods by freight and by horse. He found that the expense either way would be greater and the time to make the trip three times as long as by motor.

The trip was made from Chicago to Elgin, Ill. The truck started early in the morning and was due in Elgin at noon. It got there two hours ahead of time. When the family arrived in Elgin everything was unloaded. Two hours later the start back to Chicago was made, and at 6.30 o'clock that evening the vehicle arrived.

COMMERCIAL CAR CLIMBS PEAK

The San Bernardino City Water Company recently purchased a White 1½-ton gasoline commercial car from the McCarty-Parker Auto Company under the conditions that the machine should carry its capacity load of 3000 lbs. to the top of Strawberry Peak in the Little Bear Valley, a feat never accomplished by an auto truck and one that taxes the strength and endurance to the utmost of the touring car.

The machine was loaded with 5700 lbs., practically twice its capacity load. The party included Walter G. McCarty, the Southern California agent for White trucks; P. B. Beam, manager of the White Auto Delivery Company of San Francisco, and the president and superintendent of the San Bernardino City Water Company.

Leaving San Bernardino at 2 P. M., the party arrived at Strawberry Peak, a distance of nineteen miles, in exactly one hour and fifty-seven minutes, climbing to an elevation of over 6200 ft. without a stop. Not once did the water boil in the radiator.

Some idea can be obtained of the difficulties of this trip when it is known that no auto truck has ever been able to reach the top of this mountain. Wagons hauling freight to Little Bear Valley Dam receive 75 cents per hundred pounds. The White truck, carrying its load of 5700 lbs., at 75 cents per hundred, would have earned $42.75 for less than two hours' work.

MOTOR WAGONS MAKE GOOD IN FIRE DEPARTMENT SERVICE

"If all the horse-drawn apparatus in Detroit were replaced by gasoline motor vehicles, the saving on the pay roll alone would amount to $150,000 in a year," said Fire Commissioner W. V. Moore, in a recent interview. "And the horse cannot be compared to the motor in efficiency. I do not believe another piece of horse-drawn apparatus will ever be added to the equipment of the Detroit Department. We have a lot of expensive apparatus that we cannot very well discard but some of it can be changed so that motors can be installed for driving it. This is true with particular reference to the ladder trucks."

MONTHLY RECORD OF WHITE TRUCK IN SAN DIEGO, CAL.

The monthly record of a White truck operated by the American Truck Company, in San Diego, Cal., presents some interesting figures.

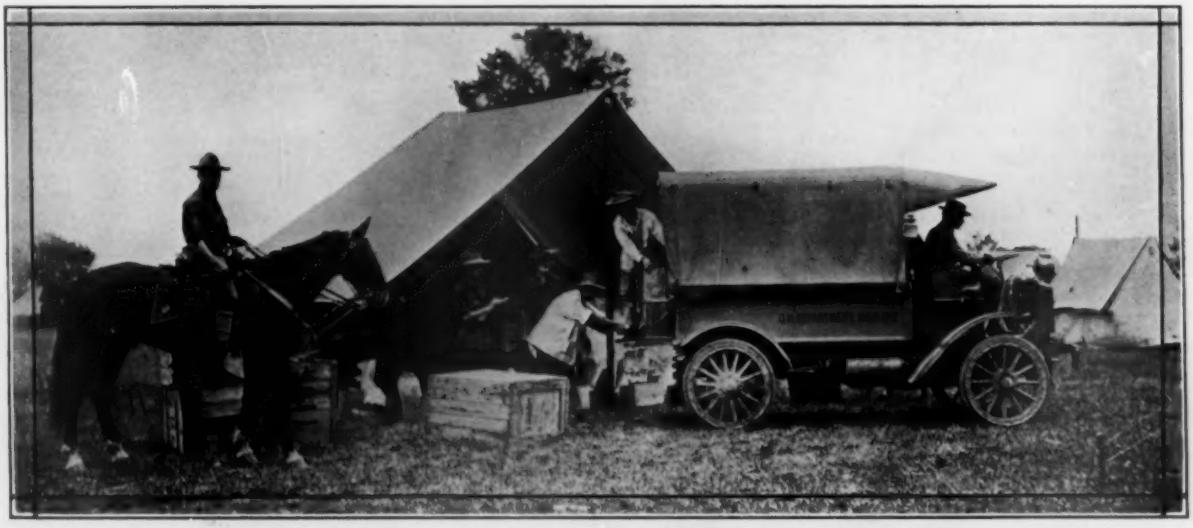
The White truck is being used in making daily trips to Ramona and return, carrrying freight and express both ways. It leaves Sixth and J Streets each morning at 6.30 o'clock and returns at 4.30 P. M. The following statement of mileage, tons hauled and operating expense for the month of May will undoubtedly prove interesting to merchants who are confronted with delivery problems:

Freight carried, 234 tons. Mileage, 3745 miles. Gasoline used 553 gallons. Oil used, 60 gallons. Grease used, 56 lbs.

Fan belts, plugs, grinding valves, etc., $24.

Sixty trips were made during the month, the truck covering an average of 62.4 miles each trip and carrying an average load of four tons. From each gallon of gasoline seven miles were obtained. The total distance for each daily trip was 121 miles.

The new combination fire engine ordered by the city of New York for its fire department was thoroughly tested recently for its pumping capacity and also for its speed. The motor power of the pumps is gasoline. It was required that the engine should throw 700 gallons of water a minute. The trial showed that it could do this. The speed requirement of thirty miles an hour was more than met. It is intended for service in the suburbs, and cost $8,500.



Commercial Car Rendered Remarkable Service at Big Military Camp

The use of motor trucks as an efficient adjunct in military camp life has been a conspicuous feature of this year's encampments of the National Guard of Pennsylvania, at Mount Gretna and Selin's Grove. Eight Autocar commercial vehicles—four at each camp—have simplified the work of the quartermaster's department, hauling supplies and rations and doing other work which formerly had to be done by the slow-plowing army mule. Each machine took the place of five mule teams. Eight cars were placed at the disposal of the National Guard, by the Autocar Company. From the time of the arrival of each brigade until its departure the machines were kept busy helping the soldiers. Tents and equipment were carried from the railroad trains, over the hills to the battleground. Food supplies and ammunition were swiftly conveyed whenever and wherever needed, and the whole problem of transportation was taken care of in a way that would have been impossible with the old-time army wagon. The officers in charge are a unit in the belief that the commercial motor vehicle is now an indispensable feature of modern army manoeuvres.

TEXAS DEALERS TO HOLD EXHIBITION

The automobile dealers and others of Dallas, Tex., interested in the development of the automobile, are working out the details of a plan to hold a commercial car exhibition and parade in the near future. It is said there are over fifty auto trucks in use in Dallas and others are being put in service every week. The commercial car is rapidly replacing horses in Dallas and it is the purpose of the dealers to educate the business interests in the value of the automobile as a means of delivery. With the rapid increase in the mileage of the city's paved streets the value of the commercial car as a means of delivery is being greatly increased. The promoters of the auto truck show have not yet fixed a date for the display, but it is expected that as soon as the consent of most of the truck owners can be obtained the machines will be paraded through the business district of Dallas.

GARFORD SERVICE BUILDING

One of the new features in commercial car service is the Eldredge Company's new service building at 1617-21 North Street, Philadelphia, Pa., which has just been completed. It is fitted out with all of the latest and most improved mechanical devices for the use and repair of commercial cars. The structure is fire-proof, two stories in height, and will accommodate the largest and highest of vans. It will be open day and night, with a full corps of expert mechanics direct from the factory. All spare parts for machines are to be carried on hand.

UP-TO-DATE MAIL CARRIER FOR ST. PAUL

After a two weeks' demonstration of the serviceability of motor trucks in hauling the mails, George E. Gere, St. Louis, Mo., agent for Chase trucks, sold a one-ton model K to F. J. Dunn, who has the contract for handling the local mails. The truck is now in service between the main postoffice and depots and substations. The car is equipped with a 20 h. p., three-cylinder motor, and is air-cooled. The tires are of solid rubber. The main frame is made of seasoned ash lumber, re-inforced with angle iron. This is the first motor truck used in regular post office service in this section of the Northwest, and it is likely that before long, others will be in service in St. Louis.

ANOTHER CONCERN was added to the motor truck row of Toledo, O., when the Grabowsky Motor Truck Company, of Toledo, was formed by William H. Durphy and others to handle the Grabowsky power wagons in the northwestern Ohio territory. The company has opened temporary quarters with the Toledo Auto & Garage Company, of Twenty-third Street, but hopes soon to be settled in its own permanent quarters.

STROUT JOINS GRABOWSKY

George H. Strout, formerly sales manager of the Electric Vehicle Company and for the past four years serving in a similar capacity at the Apperson Brothers Automobile Company at Kokomo, Ind., has joined the selling staff of the Grabowsky Power Wagon Company as eastern representative, with territory including New England, New York, Pennsylvania, Delaware, New Jersey and the District of Columbia.

THE AUTO COMPANY, of Houston, Tex., has taken the agency for the White gasoline commercial cars.

THE FEDERAL MOTOR TRUCK COMPANY, of Detroit, Mich., has added to its list of representatives the New Dominion Motors Company, Ltd., of Walkerville, Ont.

GEORGE B. ALDERMAN & COMPANY have recently erected a garage in Suffield, Mass., where they are handling, besides a line of pleasure cars, the Frayer-Miller commercial cars.

THE UNIVERSAL TRUCK COMPANY, of New York, has been incorporated with a capital of $50,000 to handle the Universal Trucks in the East. A large salesroom and service building will be opened at 245-253 West Twelfth Street, New York City.

B. W. GRIFFIN, of Toledo, O., has recently closed a contract with the Lauth-Jergens Motor Truck Company, of Fremont, O., to represent the Lauth-Jergens line of commercial cars in Lucas, Ottawa and Wood Counties. Mr. Griffin has his headquarters at the Twenty-second Street garage.

THE GENERAL MOTORS COMPANY, of Detroit, Mich., has formed a company under the name of the General Motors Truck Company, to market the entire product of commercial cars of the General Motors Company. This arrangement will allow the selling and manufacturing departments of the business to concentrate their efforts on their respective lines.

THE MALLEY MOTOR VEHICLE COMPANY, with salesrooms at 903 Boylston Street, Boston, Mass., has recently taken the agency for the Warren commercial cars, built by the Warren Motor Car Company, of Detroit, Mich. The firm has been organized by Charles Addison Malley, who has assumed the general management of the new organization. The Warren commercial car is a light delivery wagon of 1,000 lbs. capacity.

The selling organization of the Studebaker Company has undergone a change of late. The statement is made at the company's office that hereafter the pleasure car salesman will also care for the commercial end of the business.

NEW BUSINESS DEVELOPS FROM DEMAND FOR USED VEHICLES

One of the surprises in the recent evolution of the commercial car industry is the extent to which used machines are for sale and are sought by certain classes of users. One would naturally suppose that an owner of a good commercial car would use it to its limit of serviceability, but authorities on the subject claim that there is probably a machine a day sold in the New York market to a second owner. There has, in fact, developed a regular traffic in such vehicles and it appears to fill a definite need.

"Most of the buyers are out-of-town customers," said one dealer in discussing the traffiic in used commercial cars. "There is, of course, some demand in the city—small dealers who want to start conservatively or truckmen who find use for them in jobbing service—but most of the cars I have disposed of have been taken in suburban districts. Several of them have been bought by truck farmers on Long Island and in Jersey—men who want to use them for the quick transportation of fresh farm produce to market. One or two expressmen have bought trucks for bringing in loads of produce for the farmers and carrying local freight on the return trip. I know of men who are making $25 or $35 a day on trucks that cost them not over $2000.

"Used cars sell at about half the original price. We buy most of them from manufacturers' agents who have taken them in trade for new cars and are willing to drop 10 or 15 per cent. of their allowance in order to sell their new cars. We fix them up, paint them and hunt up a customer. Then we have him send in his own driver to our shops and he, with our men, goes over every part of the car, repairing it and learning its every detail as it is renovated. When the car leaves us it is good for fully two-thirds of its original service-life.

"Why do old owners sell them if they still have service in them? Well, most of them let them go when they buy larger ones; others because they are going out of business; others because they have decided to take some other car into their service and don't care for too many makes. There are various reasons, but seldom a car is so far gone that an overhauling will not make it well worth buying. Our stock covers all sorts and kinds, but as a rule the demand appears to be for trucks of from 1500 lbs. to 1½-tons capacity."

The unusual service being given by the motor trucks already in use in San Francisco has resulted in the rapid increase in the number of sales of all makes of commercial vehicles. The local dealers report their inability to secure cars fast enough to meet with the ever-increasing demand. On account of the steep hills in San Francisco, the truck end of the automobile industry has been under a severe handicap during the last few years, but with the improvement in the manufacturing and operation of the modern commercial trucks the local grades and conditions are being overcome, and the result is a rapid growth in the use of motor trucks of all sizes and styles.

E. P. JAMISON AND COMPANY, of Seattle, Wash., have taken the agency for Mercury commercial cars for the Northern Pacific Coast.

NEW GENERAL MOTORS TRUCK-SELLING PLAN

The General Motors Company has organized the General Motors Truck Company, which will act as a controlling and selling organization for the commercial cars produced by the various General Motors companies.

The new company will have its offices in Detroit, and has the same officers as those of the parent company, as follows: Thos. Neal, president; Gleeson Murphy, vice-president; J. T. Shaw, treasurer, and Standish Backus, secretary.

H. S. Stibbins will act as manager, while the sales managers of the truck companies in the General Motors organization will continue to act in their present capacities.

It is stated that this move is the preliminary one in the establishment of a system of marketing a line of commercial cars which will be formed of the Rapid and Reliance cars, covering every possible branch of automobile delivery. A service, efficiency and maintenance department is also to be established.

GRABOWSKY POWER WAGON COMPANY MAKES RECORD FOR ONE SALE

What is said to be the largest one-lot sale of motor trucks has just been closed between the Grabowsky Power Wagon Company and the new department store firm of J. L. Kessner Company, which opens September 1 on Sixth Avenue, between Twenty-second and Twenty-third Streets, New York City. The contract is for forty-three Grabowsky trucks, three of three-ton capacity and forty one-ton size for September 1 delivery. The deal involves considerably over $100,000.

Henry L. Exstein, New York representative of the Grabowsky Power Wagon Company, received the signed contract closing the deal. It is understood that the Kessner Company has laid out a very complete delivery system of thirty-eight regular routes, extending outward more than twenty miles in some instances, and that all cars will operate directly from the big store.

TAXICABS ARE MEAT FOR HOTELS

Hotels have been taking advantage of their opportunity and charging taxicab companies for stand privileges. It is said that in New York the legality of this practice is to be tested. In that city, the Waldorf-Astoria, it is said, got 15 per cent. of the gross revenue, or $30,000, from the company operating from the hotel. The Plaza got $20,000, while other hotels, according to the reports, collected amounts as follows: Knickerbocker, $15,000; Astor, $10,000; Rector's, $4,500; Netherland, $4,500; Savoy, $3,000; Union League, $5,000.

The faithful horse now goes to rest,
While modern motors work with zest.

Commercial Car Converts

L. C. Krueger, of Chicago, Ill., is a recent purchaser of a Chase.

F. A. Peterson, of Chicago, Ill., has become a user of a Mercury.

Spencer Hall, of Chicago, Ill., is a recent purchaser of a Mercury.

The Pacific Mills, of Lawrence, Mass., are using a three-ton Chase.

A. T. Alburger, of Philadelphia, has purchased a half-ton Hart-Kraft.

Fred W. Hedblom, of Chicago, Ill., is a recent purchaser of a Mercury.

The Weis Ice Cream Company, of Chicago, Ill., has purchased a Mercury.

The E. J. McCarthy Company, of Chicago, Ill., has purchased a Mercury.

The George G. Foster Company, of Chicago, Ill., now owns a Mercury.

Miller and Larkin, of Roxbury, Mass., have bought a three-ton Atterbury.

Hy. R. Worthington, of Harrison, N. J., has bought a one-ton Lansden electric.

A. M. Seymour, of Chicago, Ill., is a recent purchaser of a Chase commercial car.

The Mission Tea Room, of Chicago, Ill., has adopted a Chase for delivery service.

The Fisk Rubber Company, of Baltimore, Md., has purchased a Brush commercial car.

Fred H. Johnson, of Providence, R. I., has received a new Cadillac commercial car.

The Forest Home Cemetery, of Chicago, Ill., has purchased an electric 'bus.

Lorain, O., has issued $28,000 worth of bonds to pay for two auto fire trucks.

J. N. Cook & Sons, piano dealers of Boston, Mass., now own a two-ton Knox.

Isaac Benesch & Company, of Baltimore, Md., have bought a Peerless commercial car.

Gus A. Brand & Company, of Chicago, Ill., have added a Mercury to their equipment.

O. F. Kress & Son, manufacturers, of Lawrence, Mass., have purchased a five-ton Chase.

The Waterbury Ice Corporation, of Waterbury, Conn., has bought a five-ton Sampson.

The United States Army has purchased seven White commercial cars for use in Manila.

The Iowa Steam Laundry, of Davenport, Ia., has purchased a one-ton panel body Buick.

H. Sherman & Company, of Chicago, Ill., have added a Mercury to their delivery force.

The Bell Telephone Company, of Philadelphia, Pa., has purchased five Mack commercial cars.

St. Joseph, Mo., has made an appropriation to equip its fire department with motor cars.

L. J. Christopher, a caterer, of Los Angeles, Cal., has purchased a one-ton Sampson.

Damon & Sons, hotel keepers of Nantasket Beach, Mass., have purchased a two-ton Knox.

The Jacob Netzger Company, of Indianapolis, Ind., has bought a one-ton Lansden electric.

Los Angeles, Cal., has ordered her second auto fire truck. It was purchased for $11,840.

William G. Faubel, of Chicago, Ill., has just purchased his second Mercury commercial car.

Errenguy Brothers, of Syracuse, N. Y., have purchased a Warren Detroit commercial car.

A. B. Rhoads & Company, undertakers, of Gloversville, N. Y., have purchased a one-ton Knox.

Edmund Richard, of Suthbridge, Mass., has purchased a three-ton Dayton with special body.

Hersum & Company, of Cambridge, Mass., have purchased a three-ton Atterbury commercial car.

The Revere Rubber Company, of Providence, R. I., has purchased two 40-h. p. commercial cars.

The Singer Sewing Machine Company, of New York, has purchased a Veerac commercial car.

Frank Galta, of Chicago, Ill., is among the recent Chase commercial car converts of that city.

H. D. Sawyer, of Derby, Conn., has received a three-ton Knox for use in transportation business.

John F. Pierce, a liveryman, of Little Compton, R. I., is a recent purchaser of a one-ton Knox.

The Oakland Laundry, of Chicago, Ill., ordered two Mercury cars during the month of June.

L. Kemp & Sons, soap manufacturers of Cambridge, Mass., are recent purchasers of a two-ton Knox.

The W. B. Lyons Bakery, of Wichita, Kan., has added a Dart commercial car to its delivery equipment.

A. Shuman & Company, of Boston, Mass., have purchased four half-ton electric commercial cars.

The Doerr-Brown Company, of Los Angeles, Cal., now owns a two-ton Chase for trucking purposes.

John Everitt, a builder of Hackettstown, N. J., is now the owner of a Veerac commercial car.

Sam Hasterlik, of Chicago, Ill., has joined the "up to dates" by buying a Chase commercial car.

C. R. Bowlby, of West Summerville, Mass., has purchased a two-ton Atterbury commercial car.

The Texas Company, of Providence, R. I., has purchased a Manhattan 28 h. p. commercial car.

The Merchants' Power Company, of Memphis, Tenn., has purchased an $850 electric delivery car.

The Gettleman Brewing Company, of Milwaukee, Wis., is a recent buyer of a four-ton Samspon.

The J. S. Mott Company, of Trenton, N. J., has purchased a three-ton Garford with all appurtenances.

The Public Service Corporation, of Newark, N. J., is among recent purchasers of Lansden electrics.

The Despatch Laundry, of Minneapolis, Minn., is a recent purchaser of three Veerac commercial cars.

The Curran and Joyce Company, brewers, of Lawrence, Mass., are using a three and a five-ton Chase.

The Northwestern Supply Company, of Seattle, Wash., has purchased a one-ton Lansden electric.

The David Pender Grocery Company, of Norfolk, Va., is a recent purchaser of a Lansden electric.

The Chapin Laundry Company, of Chicago, Ill., recently bought a Sampson 1000 lb. commercial car.

Henry and S. G. Linderman, of New York City, have bought a two-ton Chase for use in delivering pianos.

The Standard Oil Company, of Jersey City, N. J., has ordered a Saurer truck for use in Los Angeles, Cal.

J. S. and William Kornblum, of Wallabout Market, Brooklyn, N. Y., have purchased a four-ton Sampson.

The Standard Varnish Works, of New York City, is a recent purchaser of a one-ton Lansden electric.

Kaufman Brothers, of Pittsburgh, Pa., have purchased twelve 1½ ton commercial cars costing $40,000.

The Federal Government has purchased nine electric commercial cars for mail service in St. Louis, Mo.

The George Ehrets Brewery, in New York City, has ordered six five ton Studebaker electric commercial cars.

The Gloucester Gas Light Company, of Gloucester, Mass., has purchased a Buick for business purposes.

Sultzberger & Sons Company, of New York City, have purchased three four-ton Benz-Gaggenau commercial cars.

The H. H. Webb Transfer Company, of Los Angeles, Cal., has a recently purchased two-ton Sampson in use.

The Merchants' Transfer and Storage Company, of Washington, D. C., now owns a 1000 lb. Lansden electric.

Abraham & Strauss, of Brooklyn, N. Y., have purchased ten one-ton Lansden electric panel body delivery vans.

The W. P. Nelson Company, of Chicago, Ill., has purchased a 1000 lb. Sampson for use in its decorating business.

The Standard Oil Company has bought a five-ton Sampson for its Sugar Creek Station near Kansas City, Mo.

The Quinn Supply Company, of Chicago, Ill., has purchased a Decatur commercial car for delivery purposes.

Sam Herrick & Sons, of Springfield, Mo., have recently acquired a four-ton Sampson to be used in transfer work.

The Peter Doelger Brewing Company, of New York City, recently bought a six-ton Benz-Gaggenau commercial car.

The City Coal Company, of Hartford, Conn., has purchased a four-ton Knox for use in the coal and lime business.

The Bernheimer and Schwartz Brewing Company, of New York City, has placed its order for a six-ton Benz-Gaggenau.

Winkler and Navatier, of Newark, N. J., are using an Atterbury two-ton commercial car in the confectionery business.

The Virginia Railway and Power Company, of Richmond, Va., has purchased a one-ton, express body Lansden electric.

The Modern Way

the *most convenient* way—the *most economical* way of keeping your tire equipment up to the highest efficiency is by using

"Firestone"

QUICK-REMOVABLE SIDE-WIRE TIRES AND RIMS

lay up the Tire, not the Truck

This equipment not only saves you money by *keeping your trucks running* on schedule, but it enables you to get *greatly increased mileage* from your tires, because there is no temptation to keep them running after they have reached the repair stage. Any driver can change tires at any time, anywhere, and without tampering with the tire fastenings. Simply remove the rim which carries the worn tire, substitute a rim with a fresh tire, and the truck keeps on running meanwhile the worn tire is being repaired in readiness for thousands of miles more service.

A POSTAL WILL BRING YOU INFORMATION THAT WILL SAVE YOU HUNDREDS OF DOLLARS

The Firestone Tire & Rubber Co., Akron, Ohio

"America's Largest Exclusive Tire and Rim Makers"

BRANCHES AND GENERAL DISTRIBUTING AGENCIES

ATLANTA, 58 Auburn Ave.
BALTIMORE, 204 St. Paul St.
BOSTON, 145 Columbus Ave.
BUFFALO, 724 Main St.
CHICAGO, 1442 Michigan Ave.
CINCINNATI, 333 East Fifth St.
CLEVELAND, 1918-22 Euclid Ave.
DALLAS, 1415 Commerce St.
DENVER, 28 West Colfax Ave.
DETROIT, 240-2 Jefferson Ave.
JACKSONVILLE, 12 East Adams St.
KANSAS CITY, 1737 Grand Ave.
LOS ANGELES, 1239 South Olive St.
LOUISVILLE, 928-30 South Third St.
MEMPHIS, 68 South Second St.
MILWAUKEE, 568 Market St.
MINNEAPOLIS, 311 South Fifth St.
NEW ORLEANS, 613-15 Baronne St.
NEW YORK, 1871-75 Broadway.
OKLAHOMA CITY, 416 North Broadway
OMAHA, 2127 Farnam St.
PHILADELPHIA, 256 North Broad St.
PITTSBURG, 5904 Penn Ave.
PORTLAND, ORE., 510 Alder St.
ST. LOUIS, Cor. 23d and Olive Sts.
SALT LAKE CITY, 147-49 South State St.
SAN FRANCISCO, Cor. Van Ness Ave. and Fulton St.
SAVANNAH, Cor. Perry and Drayton Sts.
SEATTLE, 918 East Pike St.
SYRACUSE, Hanover Square.
TOLEDO, 241-243 Erie St.
WASHINGTON, 1736 14th St., N. W.
WICHITA, 227-229 South Lawrence Ave.
MEXICO CITY, 1a Ave., Juarez No. 88.

Sales and Applying Stations—80 Other Cities

THE L. WOLF COMPANY, of Chicago, Ill., has decided to use commercial cars and to that end has purchased a three-ton Knox.

GUTTERSON AND GOULD, of Lawrence, Mass., have purchased a 3½ ton General Vehicle electric for hauling all kinds of junk.

HAMILTON, O., has purchased a Knox fire fighter which will be placed in commission at the Ones engine house when delivered.

COL. A. ANDREWS, of Baltimore, Md., is a recent purchaser of two three-ton White commercial cars for contract hauling.

THE ANHEUSER-BUSCH BREWERY, of St. Louis, Mo., has added a Peerless five-ton car to its fleet of gasoline and electric cars.

THE BELLE VERNON-MAPES DAIRY COMPANY, of Cleveland, O., has purchased a three-ton White commercial car for hauling milk.

THE AMERICAN CAR SPRINKLER COMPANY, of Worcester, Mass., has purchased a four-ton Knox to be used as a street sprinkling wagon.

STUART OTTO, of Lovelock, Nev., has purchased a 4½-ton Saurer commercial car, and has ordered a six-ton of the same make.

THE MOUNT WASHINGTON ELECTRIC LIGHT AND POWER COMPANY, of Baltimore, Md., has purchased a 1500 lb. White commercial car.

HENCKEN AND WILLENBROOK, of New York City, have recently purchased two six-ton Chase commercial cars for use in the coal business.

PROCTOR BROTHERS, of Nashua, N. H., have purchased a Sampson five-ton car for use in hauling rough logs from lumber camps to saw mills.

THE FALL RIVER IRON WORKS, of Fall River, Mass., have had a four-ton Knox delivered to them for transportation to and from their factory.

WILKINSON, GADDIS & COMPANY, of Newark, N. J., are among the recent purchasers of Lansden electrics, having purchased a two-ton delivery.

THE FEIGENSPAN BREWING COMPANY, of Newark, N. J., is among recent purchasers of commercial cars, having purchased two six-ton Knox cars.

THE AMERICAN RADIATOR COMPANY, of Kansas City, Mo., has purchased two Sampson commercial cars, one of three and one of five ton capacity.

THE MOQUIN WINE AND RESTAURANT COMPANY has a two-ton De Dion Bouton commercial car in use for delivery purposes and has ordered two more.

EDWIN G. BROWN & SON, of East Boston, Mass., are among recent purchasers of Atterbury commercial cars, having invested in an undertakers' wagon.

THE POLAR ICE AND FUEL COMPANY, of Indianapolis, Ind., recently installed a three-ton commercial car for delivering ice to creameries and milk depots.

THE WESTERN TRUCK COMPANY, of Tacoma, Wash., has purchased a three-ton Gramm, which is supplanting three horse drawn teams formerly required.

THE CHICAGO OAKWOOD CEMETERY has purchased a 1500 lb. Clark commercial car for general all around purposes, which does the work of three horse teams.

THE FIDEL-GANAHL LUMBER COMPANY, of St. Louis, Mo., has entirely abandoned horse delivery, the work now being done by five gasoline commercial cars.

THE CAMBRIA STEEL COMPANY, of Johnstown, Pa., has purchased a five-ton Alco for use in hauling freight to and from the new wire mill in Morrellville.

THE REYMANN BREWING COMPANY, of Wheeling, W. Va., is now operating six commercial cars and has disposed of nearly a dozen teams in consequence.

THE CHRISTIAN SCIENCE PUBLISHING SOCIETY, of Boston, Mass., is a recent purchaser of an Atterbury commercial car, their car being of 1½ tons capacity.

THE J. L. KESSNER COMPANY, of New York, has signed a contract for forty-three Grabowsky commercial cars, three of three-ton capacity and forty of one-ton capacity.

THE INDEPENDENCE BREWERY, of St. Louis, Mo., has purchased a Peerless five-ton car, making its fourth car. The cars frequently travel thirty miles from the brewery.

THE UNION ELECTRIC LIGHT AND POWER COMPANY, of St. Louis, Mo., has twenty-three new electric commercial cars in service ranging from light delivery to heavy types.

BIRMINGHAM, ALA., has placed an order with the Seagraves Company, of Columbus, O., for nine motor-propelled combination chemical and hose fire-wagons. The cost will be $40,000.

THE GULF REFINING COMPANY, of Philadelphia, Pa., has purchased three Alco cars built with tank bodies for carrying oil. The tank holds 800 gallons, making a load of 5000 lbs.

THE DORCHESTER ICE COMPANY, of Dorchester, Mass., has put a commercial car in service to carry ice for delivery to the horse teams, thereby avoiding several trips of the horse-drawn wagons.

FORT WORTH, TEX., now has an auto patrol purchased at a cost of $4,200. It is a 45-60 Rambler and can be converted into an ambulance. It will carry sixteen prisoners and three officers.

THE BAY STATE TRUST COMPANY, of Boston, Mass., is having constructed a special bank car, made burglar proof, by the Keystone Vehicle Company. The chassis is by the General Vehicle Company.

BUCYRUS, O., has awarded a contract to the Seagraves Company, of Columbus, O., for a combination hook and ladder motor truck and chemical fire engine. The engine will be of the six-cylinder type, generating 55

THE JACKSON COUNTY (MO.) BOARD has sold its horses and bought four five-ton Sampsons, one equipped with a 1000 gal. tank to sprinkle oil upon highways, and the other with stake platform for hauling building materials and supplies.

THE NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY, of Boston, Mass., has placed an order with the Alden Sampson Company for eight one-ton commercial cars, making a total of thirteen now in the service of the company.

THE RAINIER VALLEY EXPRESS COMPANY, of Seattle, Wash., has recently installed an Alco which makes each day three and four round trips, a distance of twenty-two miles each, in the suburbs of Seattle, carrying a miscellaneous cargo of vegetables and other merchandise.

GIMBEL BROTHERS, whose New York department store uses only motor vehicles in its delivery service, has just purchased eight Alco trucks, in addition to the five of this make which it already has in operation. The new order calls for two-ton chasses, five to have furniture bodies, two rack bodies and one to have a stake body.

KANSAS CITY, MO., fire commissioners have added a combination chemical and hose motor truck and a combination chemical and pumping motor wagon. The latter machine has a tank capacity of 750 gallons of chemical and carries 1,000 ft. of hose. Its engine is capable of throwing a vertical stream 150 ft. in the air. The cost of the machine approximates $8,500.

KANSAS CITY, KAN., has decided to add two more combination hose reels and chemical engines on motor trucks to her fire department. The purchase was authorized by the city commission in response to recommendations upon the part of the firemen and demands from business men. The entire department will eventually be revolutionized, automobile apparatus superceding the old style machinery.

DULUTH EMPLOYS MUNICIPAL MOTOR CARS

The city of Duluth, Minn., is steadily but surely replacing horses with automobiles for use in the various departments. The first to make the change was the police department, which was equipped with a large Franklin touring car for special calls. The police officials declare that it is worth its weight in gold, and that they cannot understand how they ever were able to get along without it.

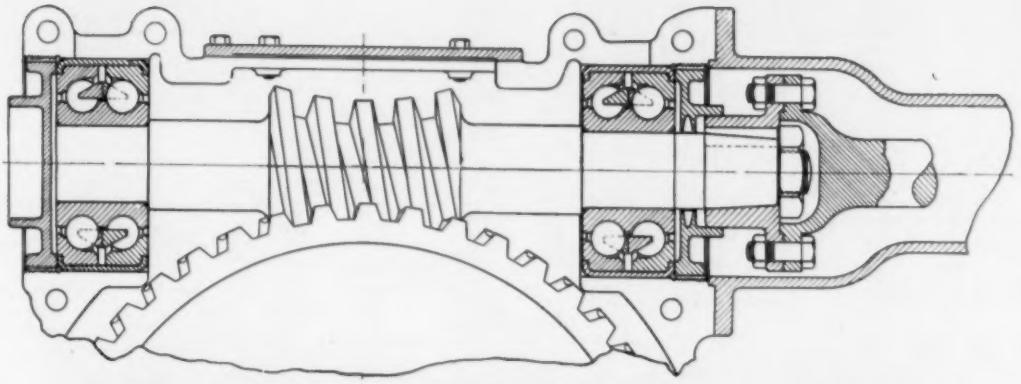
There isn't the slightest doubt but that the Franklin has greatly increased the efficiency of the department. Many calls have been answered on short notice, some of them at long distances, which would otherwise have had to go with little attention. Often the very speed which has been possible with the machine has resulted in the arrest of criminals who would otherwise have gotten away. In addition to these calls there has been much other business of the department which has received attention because of the time-saving ability of the new service.

INTEREST IN FIRE APPARATUS KEEN

That fire departments throughout the country are keenly interested in self-propelled equipment, is evident from orders recently placed. Of the cities to adopt motor apparatus are Palestine, Tex., Ashtabula, O., Evanston, Ill., Los Angeles, Cal., Long Beach, Cal., Wilmington, Del., Pottstown, Pa., Elyria, O., all of which have purchased Robinson first-class piston pumping engines, the last named having ordered two. Kansas City, Mo., Calgary, Canada, Norfolk, Va., Vancouver, and Saginaw, Mich., recently ordered Webb equipment.

THE BENWOOD BREWING COMPANY, of Benwood, W. Va., recently placed an order for an automobile truck of four tons capacity. The company is having a garage built in connection with its plant for the machine, which will be delivered soon. The auto truck will be used in delivering beer to the saloons and private consumers.

NEW DEPARTURE
Ball Bearings



Simple mounting of New Departure double row ball bearing in worm drive mechanism.

The Logical Bearing for Worm Gears

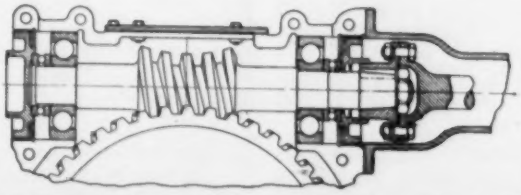
The New Departure double row ball bearing is particularly well adapted for efficiency in worm gear mechanism. Here, the thrust loads are unusually severe, often equaling the radial strains. The New Departure bearing resists both the radial and thrust stresses simultaneously, if necessary, and without friction.

It maintains the absolute alignment that is essential.

Besides being superior in efficiency, it is also economically mounted because of the few parts to assemble, the minimum machining necessary and no possibility of error in installing.

This bearing cares for the severe service conditions in worm gear mechanism even more effectually than will any combination of single row and thrust bearings and offers, besides, other important advantages. Note the comparative mountings illustrated on this page.

You can have our descriptive catalogue and the co-operative service of our engineering department, for the asking.



Complicated mounting of combination of single row and thrust ball bearings in worm gear mechanism.

The New Departure Mfg. Co., Bristol, Conn.

Western Branch Office, Room 1016-17 Ford Bldg., Detroit

$1.00

Pays for One Year

¶ It represents a small investment and large returns. Each issue of

THE COMMERCIAL CAR JOURNAL

will contain practical and helpful information. You need it in your business.

Date _____

Chilton Company,
Philadelphia.

Please enter my subscription for one year, starting with the next number of the Commercial Car Journal. Enclosed find one dollar (stamps accepted).

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You get your money's worth out of

UNITED STATES SOLID MOTOR TIRES

When your old tires wear out and must be replaced, how does your tire account balance up? Must you charge these unnecessary items to it?—

Delivery delays and loss through tire trouble and defects.

Tire repair expense due to defective tire construction.

Excessive tire renewal cost due to failure to give the proper length of service.

SPRAGUE, WARNER & COMPANY
INCORPORATED
WHOLESALE GROCERS

CHICAGO June 9, 1911.

United States Tire Company,
Chicago, Illinois.

Gentlemen:

We are pleased to inform you that the two 36 x 6 "Hartford" flange solid tires, which you put on for us today are replacing tires which have given us very gratifying service.

They are on a 5 ton truck and have travelled approximately eight thousand miles in ten months without any loss of time whatever during that period.

Considering the heavy load and steady haul over Chicago streets, we feel that it is an excellent record, and thought you would be glad to know of it.

Yours truly,
SPRAGUE, WARNER & COMPANY.
By W C Hecht

Or can you, like Sprague, Warner & Company, order new tires with the knowledge that the old tires carried your heaviest loads thousands of miles without delivery delay or interruption from any cause whatever?

If you cannot do this your motor truck system is not producing the profit that it should produce—**and will produce if you run your trucks on United States Solid Motor Tires**

The strongest tires in the world.

They are strong enough for the most severe service—resilient enough to save the truck mechanism from the wear and tear of the road.

Send for our catalog today

UNITED STATES TIRE COMPANY
BROADWAY AT 58TH STREET, NEW YORK

Just a Few of the Good Things Our Customers Say of

FEDERAL ONE TON TRUCKS

THE WHITTEN-GILMORE CO.

DISTRIBUTORS OF

CHALMERS AND HUDSON MOTOR CARS FOR EASTERN MASSACHUSETTS

SALESROOM 807 BOYLSTON STREET BOSTON, MASS.

June 18, 1911.

Federal Motor Truck Co.,
Detroit, Mich.

Gentlemen:-

In reply to your favor of June 13th, relative to services and so forth of Federal Trucks, we are of the opinion that for a one ton truck the Federal fills the bill in every particular, and as far as we have been able to ascertain, it is without question the best truck of this description on the market. We are very much pleased with it, and anticipate doing a large business in our territory.

Yours very truly,

THE WHITTEN-GILMORE COMPANY.

ABM/AMD. Manager Truck Dept.

HUPP MOTOR CAR COMPANY

Hupmobile

DETROIT MICHIGAN, U.S.A.

June 28, 1911.

Federal Truck Co.,
Detroit, Michigan.

Gentlemen:-

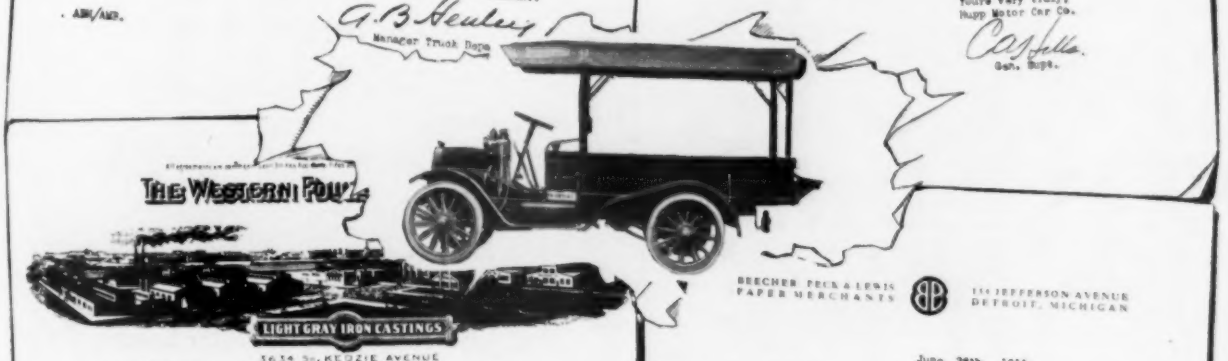
We wish to take this opportunity to advise you that the Federal Truck recently added to our traffic department is giving excellent satisfaction.

We find the truck very economical and very efficient. It is just the right size for our needs, and we are proud to have such a machine in our service.

We shall be glad to recommend this truck to any people whom you might wish to refer to us.

Yours very truly,
Hupp Motor Car Co.

Gen. Supt.



3634 So. KEDZIE AVENUE

Chicago, June 16, 1911.

Federal Motor Truck Co.,
Detroit,
Michigan.

Gentlemen:-

In answer to your inquiry of the 12th instant, regarding our Federal Truck, beg to state our experience has been very satisfactory, the truck having been in constant service daily, without interruption since its purchase and has been a great aid to us in handling our small shipments in and out. We find ourselves in position to give our customers better service, due to the installation of this truck.

Very truly yours,

THE WESTERN FOUNDRY COMPANY

Treasurer.

JFH-h

BEECHER, PECK & LEWIS
PAPER MERCHANTS

111 JEFFERSON AVENUE
DETROIT, MICHIGAN

June 26th, 1911.

Federal Motor Truck Co.,
Detroit, Mich.

Gentlemen:

The latter part of December, we received from you one of your Federal Trucks. This Truck has now been in operation five months, averaging 1120 miles per month. During this time, we have had no delays or hold-ups whatever of any kind, except once for tire trouble.

We want to tell you that we are more than pleased with this Truck, particularly for efficiency and economy. It takes the place of two two-horse delivery wagons. This Motor Truck does in one day what these two teams took a whole day to do, and our saving in this particular department has been forty per cent.

Wishing you continued success, we are,

Yours truly,

A.F.Peck.

BEECHER, PECK & LEWIS.

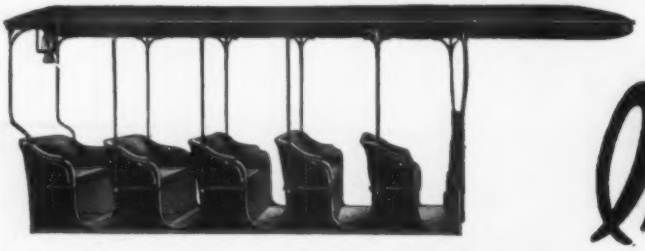
By A. F. Peck
Treas.

Wheelbase, 110 inches; weight, 3200 lbs.; horsepower, 30; four cylinders; radiator, vertical tube suspended on springs; Bosch high tension magneto; clutch, 16-inch cone, leather faced; selective, three speed forward and reverse transmission; Timken bearings in wheels; 36-inch wheels front and rear; pressed 7/32-inch frame; 12 x 1½-inch brakes on jack shaft; 16 x 2½ inches on rear wheels; 19-tooth front sprocket, 46-tooth rear.

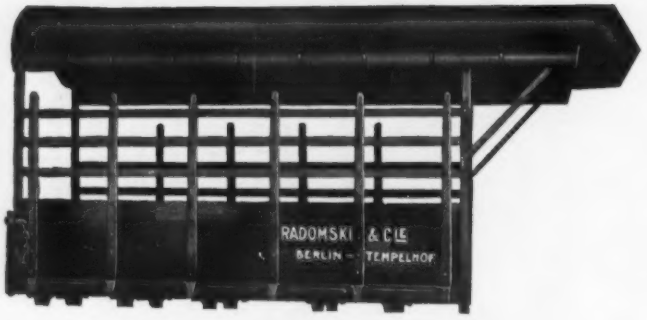
FEDERAL MOTOR TRUCK COMPANY, 102 Isabelle St., Detroit, Mich.

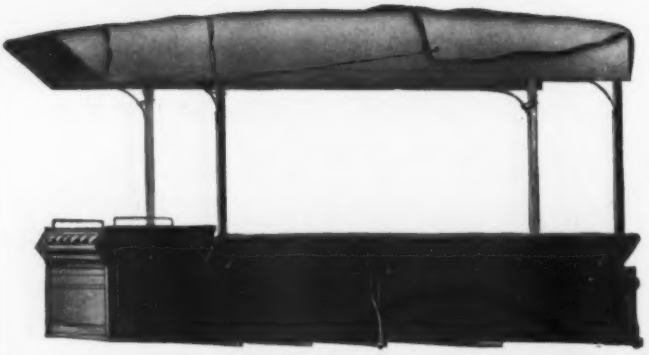
SALES REPRESENTATIVES

NEW YORK CITY: Motors Engineering & Sales Co., 250 W. 54th St.
BOSTON, MASS.: The Whitten-Gilmore Co., 709 Boylston Street
PHILADELPHIA, PA.: Fischer Motor Car Co., 511 North 11th St.
DETROIT, MICH.: Thompson Auto Sales Co.
ST. LOUIS, MO.: Whitman Motor Car Co., 6900 S. Broadway
CANADA: New Dominion Motors Co., Ltd., Walkerville
SAN FRANCISCO, CAL.: Standard Motor Car Company
PORTLAND, OREGON: Stoddard-Dayton Auto Co.
LOS ANGELES, CAL.: Standard Motor Car Co.
DES MOINES, IOWA: Brown, Corley, Ellis Co.
TOLEDO, OHIO: Atwood Automobile Co.
CAMDEN, N. J.: The E. M. F. Co.
LYNN, MASS.: C. E. Whitten, 40 Central Ave.



McIntyre





Commercial Power Wagons

Special bodies for every purpose.

Dealers handling the McIntyre line are the leading dealers in their communities:

Because—

The McIntyre line is complete.

The price is right.

One sale produces other sales.

It is built on honor.

The Heavy Duty Motor has an automatic governor, which absolutely prevents overspeeding—the source of 90% of all truck troubles.

The owner, not the driver, controls the speed.

It is built for service.

The McIntyre advertising campaign in the newspapers promotes business for the dealers.

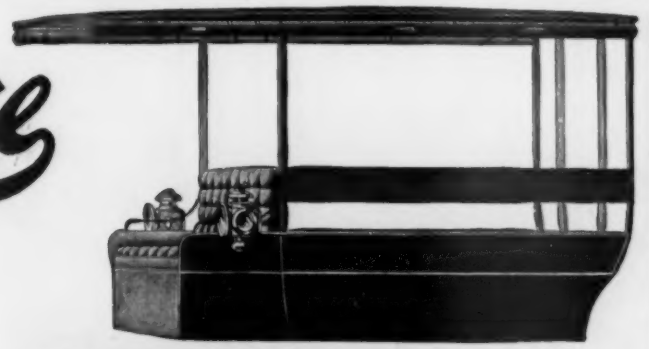
The McIntyre advertising campaign is the greatest newspaper publicity campaign ever applied to the exploitation of a commercial power wagon.

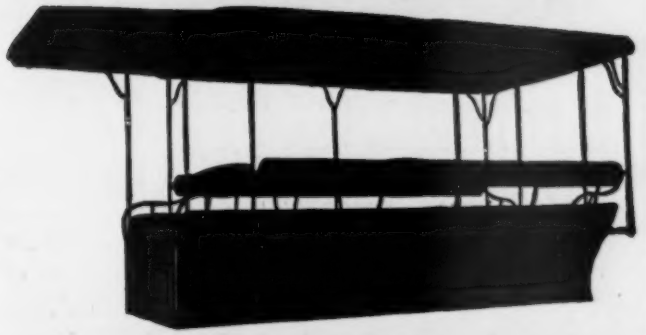
W. H. McIntyre Co.

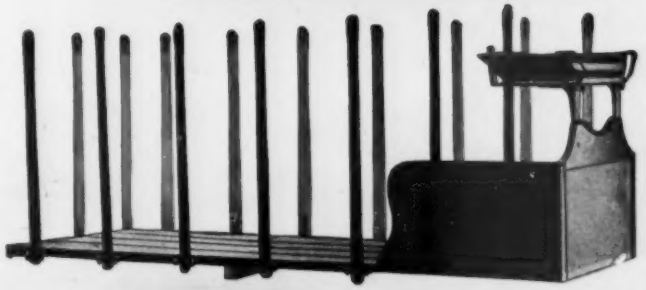
AUBURN INDIANA

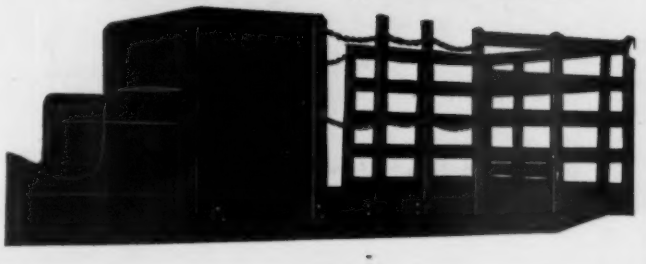
McIntyre

Commercial Power Wagons









have proven their adaptability to every commercial need. They are making good everywhere, and quality and price considered they are absolutely without a rival.

Note these specifications:

Model "XIV"—Guaranteed capacity 2000 lbs.

Tires: 2½", solid rubber, or at an expense of $50.00 extra, 3" in front and 3½" in the rear.

Motor: 24 H.P., two-cylinder bore 5¼".

Stroke: 4¾". Water-cooled.

Transmission: Planetary, or at an extra charge of $150.00, sliding gear with three speeds forward and one reverse.

Ignition: Dual system, Magneto and Dry cells.

Price of Chassis, $1300

Model "XXI"—Guaranteed capacity 3000 lbs.

Tires: 3" solid rubber in front 3½" in the rear.

Motor: 35 H. P., 4 cylinders, water-cooled, 4¼" bore, 4½" stroke.

Transmission: Planetary, or at an expense of $150.00, sliding gear with three speeds forward and one reverse.

Ignition: Dual system, Magneto and Dry cells.

Price of Chassis, $1600

We can furnish any kind of body required at lowest prices.

Send for particulars regarding the complete McIntyre line; also for information regarding our newspaper campaign conducted over the dealer's own name in the dealer's own city.

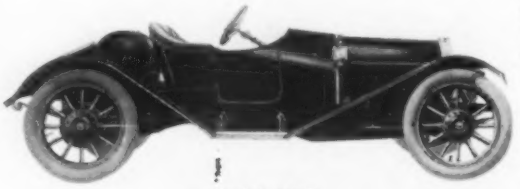
W. H. McIntyre Co.

AUBURN INDIANA

Overland

Nineteen-Twelve Announcement

FOR the season of 1912 we announce the following: Nine new body styles, including runabouts, roadsters, small and large touring cars, torpedoes and coupes. Horsepower will run from 25 to 45. Prices, $850 to $2000. The following specifications describe some remarkable motor car values for 1912—values made possible by the efficient organization and enormous facilities of The Willys-Overland Company—the greatest plant of its kind in the world. We know for a fact that no other manufacturer can produce these cars to sell at these prices without losing money. Write for a catalogue N 48 giving thorough descriptions of full 1912 line.



Model 59-R

Two-Passenger Torpedo Roadster (Model 58-R) $850

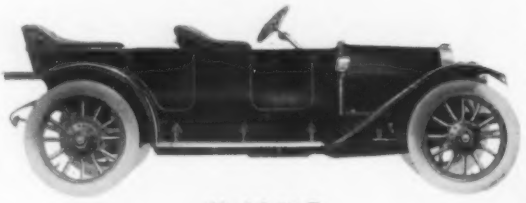
96-inch wheel base, 3⅜ x 4½ motor, 25 h. p., Splitdorf magneto and batteries, 32 x 3½-inch Q. D. tires; color, Deep Overland Blue, three oil and two gas lamps, generator, full set of tools.

Two-Passenger Torpedo Roadster (Model 59-R) $900

Same specifications as Model 59. See opposite page.

Three-Passenger Coupe (Model 59-C) $1250

Same specifications as Model 59. See opposite page.



Model 60-T

Five-Passenger Four-Door Touring Car (Model 60-T) $1200

114-inch wheel base, 4⅛ x 4½ motor, 35 h. p., Remy magneto and batteries, 32 x 4-inch Q. D. tires, Overland Blue body, gray gear and wheels, three oil lamps in black and brass finish, two gas lamps, generator, full set of tools.

Two-Passenger Torpedo Roadster (Model 61-R) $1500

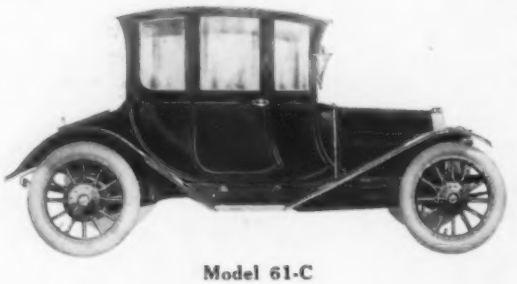
118-inch wheel base, 4⅜ x 4½ motor, 45 h. p., Bosch magneto and batteries, 34 x 4-inch Q. D. tires; color, Brewster Green, ivory stripe, all bright parts nickel-plated, three black and nickel oil lamps, two black and nickel gas lamps with gas tank; full set of tools.

Four-Passenger Torpedo (Model 61-F) $1500

Same as Model 61-R.

Five-Passenger Fore-Door Touring Car (Model 61-T) $1500

Same as Model 61-R.



Model 61-C

Four-Passenger Coupe (Model 61-C) $2000

Same as Model 61-R.

The Willys-Overland Company
Toledo, Ohio

Model 59–$900

A 30-Horsepower Five-Passenger Fore-Door Touring Car

THE introduction of our new 30 h. p. five-passenger fore-door touring car (Model 59) at $900 is probably the greatest single manufacturing stride ever made in this or any other industry. This car is a real automobile—not a little, frail, cramped machine, but a good, big, roomy car that is ample for five passengers. The motor is 4 x 4½ and will develop greater power than any other of a similar bore and stroke. It has the fashionable fore-door body with door handles inside and center control.

In every respect it is beautifully finished. The upholstering is of good leather, stuffed with hair. All trimmings are of the finest materials available. This new model from every possible comparative standpoint is the greatest value for the money that has ever been placed on the market.

The $900 car is made in two body styles—five-passenger fore-door touring car and two-passenger torpedo roadster

Read the Specifications Carefully

Specifications

MODEL 59

Wheel Base—106 inches.

Tread—56 inches.

Motor—4 inches by 4½ inches. Cylinders cast separately. L-head type, large-sized valves, valve springs enclosed in aluminum housings; push rods lubricated, insuring a sweet-running, silent, powerful motor.

Carburetor—Model L Schebler (the best Schebler makes).

Transmission—Selective, three speeds and reverse, center control; F. & S. annular ball bearings.

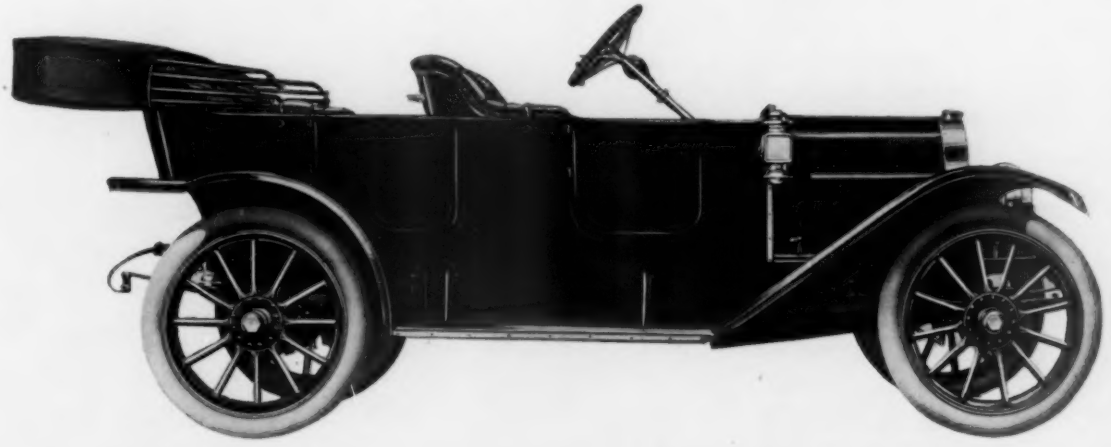
Steering Gear—Worm and segment adjustable, 16-inch wheel.

Ignition—Two independent systems, Splitdorf magneto and battery, one set of plugs.

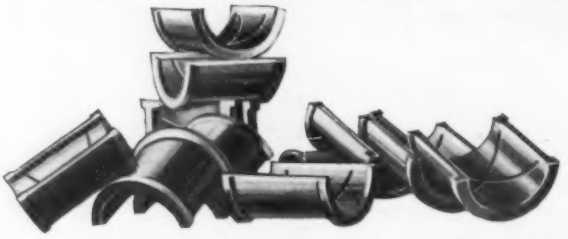
Brakes—Internal expanding, external contracting, on rear wheels.

Springs—Semi-elliptic front, three-quarter elliptic rear, 1¾-inch wide.

Horsepower—30.
Frame—Pressed steel.
Clutch—Cone.
Front Axle—Drop forged I-section.
Rear Axle—Semi-floating.
Wheels—Artillery, wood, 12 spokes, wide hub flanges.
Spokes—1¼-inch spokes, bolt for each spoke.
Tires—32-inch by 3½-inch.
Mohair top and glass windshield $50 additional.
Quick detachable tires—The most rational, quickest-operated, longest-lived tires made.



Parsons' White Brass and Cramp's Special Bearing Bronze



These metals are used by the following companies among many others:

PEERLESS MOTOR CAR CO.
LOCOMOBILE CO. OF AMERICA
WINTON MOTOR CARRIAGE CO.
LOZIER MOTOR CO.
PACKARD MOTOR CAR CO.
PULLMAN MOTOR CAR CO.
BENZ AUTO IMPORT CO. OF AMERICA
MOON MOTOR CAR CO.
CHALMERS MOTOR CAR CO.
HUDSON MOTOR CAR CO.
HUPP MOTOR CAR CO.
F. B. STEARNS CO.
ALDEN SAMPSON MANUFACTURING CO.
MACK BROS. MOTOR CAR CO.
VELIE MOTOR CAR CO.
NATIONAL MOTOR VEHICLE CO.
MERCER AUTOMOBILE CO.
KISSEL MOTOR CAR CO.
WOODS MOTOR VEHICLE CO
ABBOTT MOTOR CO.
PREMIER MOTOR MANUFACTURING CO.
REO MOTOR CAR CO.
INTERNATIONAL HARVESTER CO.

These manufacturers have earned a reputation for their cars only by the expenditure of thousands of dollars and long years of hard labor. They cannot afford to risk this hard-earned reputation by the use of inferior metals —injury to a few cars would destroy the reputation of their entire output.

The experience of over three-quarters of a century in building engines has enabled us to give to the automobile industry absolute perfection in these two bearing metals.

PARSONS' WHITE BRASS is used by these manufacturers in the main engine bearings and connecting rods, and CRAMP'S SPECIAL BEARING BRONZE in the wrist pin end of connecting rods, axle bearings, transmission gear bearings, etc.

PARSONS' WHITE BRASS is the most durable metal manufactured. It is the hardest and strongest Babbitt metal, having a higher melting point than any other Babbitt. Moreover, PARSONS' WHITE BRASS, having twice the elastic limit of any other Babbitt metal under compression, resists without injury to itself the explosion of the gasoline motor. Notwithstanding these durability qualities PARSONS' WHITE BRASS has never been known to score a crank shaft, a very valuable consideration when it is realized that a bearing costs a few cents while a crank shaft costs many dollars. The antifriction qualities of our metal are unsurpassed. It gives extraordinary service because it has extraordinary qualities.

PARSONS' WHITE BRASS BEARINGS have been run for twenty years without material wear in our marine engines, and there is a Packard car running in Philadelphia with the bearings untouched or unadjusted after seventy-five thousand miles of running.

In bearings where hard bronzes are required, CRAMP'S SPECIAL BEARING BRONZE should be used. Where the area is limited and the pressure is great no bearing metal is equal to it. It has the quality of hardness, resisting wear and is of high elastic limit under compression resisting deformation.

Write for full particulars and list of automobile bearings for which these two metals are used.

Our guarantee of quality, uniformity and fair treatment is back of every casting sold.

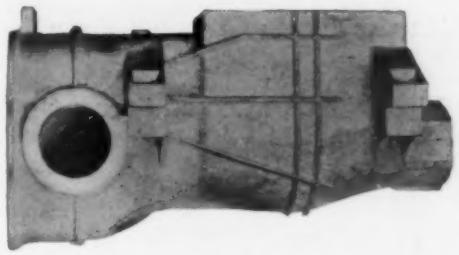
The William Cramp & Sons Ship & Engine Building Co.

PHILADELPHIA, PA.

AUTOMOBILE BRAND CASTINGS

Get Good Bearings

Good bearings carry weight with little fuel expense.



AUTOMOBILE BRAND

PLASTIC BRONZE for general bearings.
PHOSPHOR BRONZE for hardened and ground shaft.
DIE CASTINGS when the compression strain is not excessive.

The practical buyer will figure what it costs to carry each pound of dead weight a year; this is constant load and more important than capacity load, as it catches you going and coming.

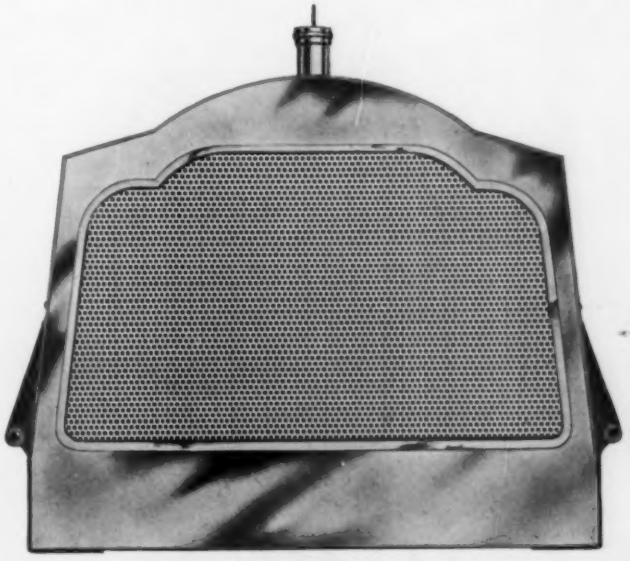
AUTOMOBILE BRAND

ALUMINUM castings weigh only one-third as much as Red Brass, are about as strong, and better suited for many purposes.

MANGANESE BRONZE is a good substitute for drop forgings when the quantity will not warrant the cost of dies, and when prompt deliveries are a factor.

LIGHT MANUFACTURING & FOUNDRY CO., POTTSTOWN, PA.

VITALLY IMPORTANT



to the success of a motor truck is the RADIATOR,—this fact is universally recognized —no other part deserves the same consideration.

We manufacture radiators for nearly every manufacturer of high-grade automobiles. If you will write us, we can give you a list of the most successful automobile makers in America,—all of whom use

FEDDERS RADIATORS

What does this prove to you?

FIRST—that we have the most satisfactory radiator: SECOND—that we have the facilities for manufacturing in quantities, so that we can DELIVER ON DATES PROMISED.

Commercial Cars require radiators that will withstand all sorts of wear and tear and severe road shocks,—it is this fact that prompts the leading makers of trucks to use FEDDERS RADIATORS.

Our new catalog contains a world of valuable information for those afflicted with Radiator troubles,—you're sure to find a remedy somewhere in its pages.

MAY WE SEND IT?

FEDDERS MANUFACTURING WORKS, BUFFALO, NEW YORK

MOTOR TRUCK BANDS
FOR
SINGLE OR DUAL TIRES

MATERIAL—We are putting into the construction of our bands the very best material obtainable.

WORKMANSHIP—Our men have become proficient in this line of work through experience gained in the growth of our motor truck band business.

PRICE—The process of electric welding together with the volume of work done in this department assures satisfactory prices.

DELIVERY—An unexcelled equipment for the handling of this trade and recent additions to our factory enable us to give good deliveries.

We solicit your orders along the lines above mentioned

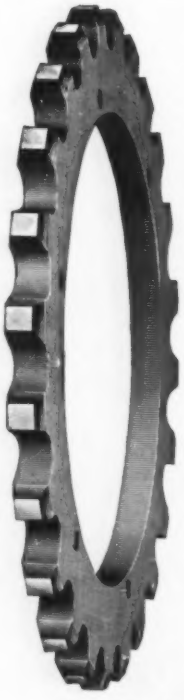
THE STANDARD WELDING CO.

Western Representative,
L. F. McCLERNAN,
1243 Peoples Gas Bldg., CHICAGO
1417 Ford Bldg., DETROIT

ELECTRIC WELDING PIONEERS

CLEVELAND

Eastern Representative,
L. D. ROCKWELL,
United States Express Bldg., NEW YORK



CULLMAN SPROCKETS and Differentials

in stock and to order.

Send for catalog and let us quote you on your requirements.

CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE

The Heart of 200 Commercial Car Catalogs On One Sheet

Table of Specifications of 1911 Gasoline Commercial Cars

PRINTED BY THE PUBLISHERS OF

THE COMMERCIAL CAR JOURNAL

IS NOW READY

TELLS AT A GLANCE

Type of Engine, Bore and Stroke, Ignition, Oiling, Cooling, Transmission, Drive, Axles, etc., as well as Brake and Clutch Lining Materials, Brake Area, Number, Size and Threads of Spark Plugs, Type of Rims, Size of Loading Platform, Height of Platform, Amount of Rear Overhang, etc., etc., enabling a RAPID COMPARISON OF ONE TRUCK WITH ANOTHER.

This invaluable table will be mailed to any address on receipt of $1.00 (stamps accepted).

Chilton Company
Market and 49th Streets, Phila.

Kinwood

WHAT'S in a name? Lots—in this one.

KINWOOD is the family name of the whole list of Kinsey products.

KINWOOD Frames, KINWOOD Hoods, KINWOOD Radiators, are too well known to require any introduction.

But here's a new addition to the family—

KINWOOD GASKET —a sturdy little gasket, splendidly made of copper and asbestos.

Don't delay meeting him; he's well worth knowing.

Ask us to send him to you; look him over critically; subject him to any test, whatsoever; he'll come out with colors flying.

He's made right, as you'll see; and sold right, too.

Our new catalog describes the whole KINWOOD family; send for it.

The Kinsey Manufacturing Company

Toledo Ohio

Chase Motor Vehicles Selected by the Big Ones Who Know

ORDERED IN DOZEN LOTS BOTH IN AMERICA AND ABROAD

The picture shown above is a recent shipment of Chase Surreys to Molinero & Co., Buenos Ayres, Argentine Republic.

Chase wagons are successfully operated in countries where there are very poor roads or no roads at all, and where there are very few mechanics who understand automobile repairing, where a breakdown may mean a month or more waiting to replace a broken part.

The quantity repeat orders tell the story of Chase success. Send for 1911 catalog.

CHASE MOTOR TRUCK CO. :: 10 Jefferson St. :: SYRACUSE, N.Y.

THE SCHWARZ WHEEL

Schwarz Patent Spokes

Strongest, Safest, Most Economical

The only wheel which will stand up continuously under heavy strains

Spokes at the tenon are grooved and mortised and interlock, forming an absolutely compact, immovable assemblage which cannot loosen under the most severe strain. The only wheel with positive and evenly distributed spoke support. Can be made complete and shipped without hub.

We maintain a special, fully equipped department for the manufacture of heavy truck wheels, and are prepared to design and proportion wheels in proper keeping with other features of construction. Our engineers are at your disposal.

Some of the leading manufacturers of motor trucks who use the Schwarz Wheel:

American Locomotive, Packard, Mack, Alden Sampson, Rapid, Hewitt, Pope, Peerless, Stearns, Dayton Auto Truck, Kelly, Metzger Commercial Truck, American La France Fire Engine, Saurer, Seagrave, Petrel, Lansden, Thomas.

Schwarz Wheel Co., Frankford, Philadelphia

Lauth-Juergens

ONE, TWO AND THREE TON TRUCKS

Guaranteed for Life

The motors in the Lauth-Juergens one, two and three-ton trucks are guaranteed against defective workmanship and material for the life of the truck—CAN YOU ASK MORE?

THE LAUTH-JUERGENS TRUCKS are the latest and most powerful built trucks to be had anywhere in the country regardless of price or make. They hold an unquestionable reputation for speed, strength and endurance and are built for years of hard service. They are constructed of the best materials obtainable, bear the finest workmanship the world affords and are manufactured in our own shops—TRANSMISSION, JACK SHAFT, CLUTCH, GEARS AND ALL. That's why Lauth-Juergens trucks are real delivery insurance. Send for complete specifications and our 1912 catalogue telling the story of another great success in motor truck building. Reliable agents should communicate with us at once for 1912 territory.

LAUTH-JUERGENS TRUCKS ARE DELIVERY INSURANCE

Address: LAUTH-JUERGENS MOTOR CAR CO., FREMONT, OHIO

SPECIFICATIONS OF ONE-TON TRUCK

Motor—**Rutenber,** four cylinder, water cooled, 4" bore, 4" stroke.
Carburetor—Schebler, float feed type.
Ignition—Bosch high tension magneto, dual System.
Transmission—Selective type, four speeds forward and reverse.
Clutch—LJ Patent disc, 3 piece, simple and positive.
Brakes—Two internal on rear axle, two external on jack shaft
Drive—Double chain.
Axles—Ball bearing; front, 1¼"; rear, 2".
Wheels—36" front and rear. Artillery type.
Tires—36 x 3" front, 36 x 3½" rear.
Frame—Solid angle steel 2 x 3", supported by long truss rods to prevent vibration.
Wheel Base—105".
Tread—56".
Equipment—3 lamps, horn, oil can, full set of tools and jack.
Weight—Chassis with driver's seat, 2600 lbs.
Price—Chassis with driver's seat, $1950.00 F.O.B. Fremont, Ohio.

"Trojan" MODEL "A" MOTOR-TRUCK Top

The "TROJAN" Model "A" top represents more real value—affords more protection against cold winds, rains and blizzards—stands more wear and tear, and looks better for a longer time than any other canopy top on the market.

All standards and fixtures are hand forged and japanned; covered with solid, heavy No. 10 oiled Army duck.

Tapered posts and sockets absolutely prevent top from working loose and curtains can be either rolled up or folded across top.

CLEAR VISION front, rear and sides.

Inquiries are solicited from responsible manufacturers concerning their Motor-Truck top requirements.

We offer strictly high-grade production for the most exacting conditions and our tops are found on the foremost Motor-Trucks.

The Troy Carriage Sun Shade Co., MANUFACTURERS TROY, OHIO, U. S. A.

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DOES YOUR TRUCK OR DELIVERY WAGON TRAVEL?

GET A JONES SPEEDOMETER

AND KNOW TO A CERTAINTY

The most necessary of ALL accessories. Prevents your driver from being arrested for exceeding the speed limit. Gives you a trip and season record of the mileage travelled, enabling you to compute the cost of maintaining your delivery system.

Owing to the greater vibration of commercial vehicles that use solid tires and to positively insure a steady speed indicating hand, these models of Speedometers are geared two to one, that is, while the flexible shaft turns at the regular speed the Speedometer shaft turns twice as fast. The indicating hand remains steady and the large figures are quickly and easily read.

The constantly increasing use of motor trucks, has caused a big demand for Speedometers to be used on this class of vehicle.

The JONES SPEEDOMETER for motor trucks is identical in general construction with the JONES for pleasure vehicles and is backed by our guarantee.

Model 28 / 25 - 3" 25 Mile, $27.50
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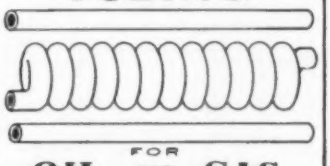
Send for descriptive circular

THE JONES SPEEDOMETER
New Rochelle, New York
Chicago: 1430 Michigan Ave. Boston: 109 Massachusetts Ave. Philadelphia: 1406 Vine St.

SEAMLESS
BRASS AND COPPER
TUBING



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PIPES

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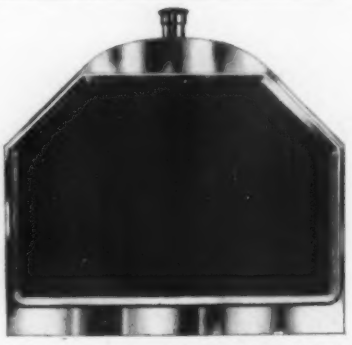
ERIE, PA.

Quality **Price**

Delivery

Best in the Business



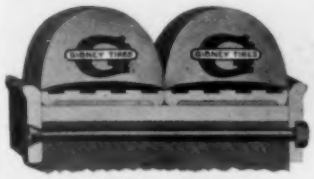
The Mayo—the radiator thoroughbred

¶ Good advice—

Put Up a Good Front —then make good.

¶ That's what Mayo Radiators are doing and have been doing for years on America's best known and best liked cars.

Mayo Radiator Co. :: New Haven, Conn.



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ORIGINATORS OF THE WIRELESS TIRES
—MADE IN THE UNITED STATES.

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The Service of GIBNEY Wireless tires is guaranteed.

We have an interesting collection of facts from users that will save you money—yours for the asking. Write to-day.

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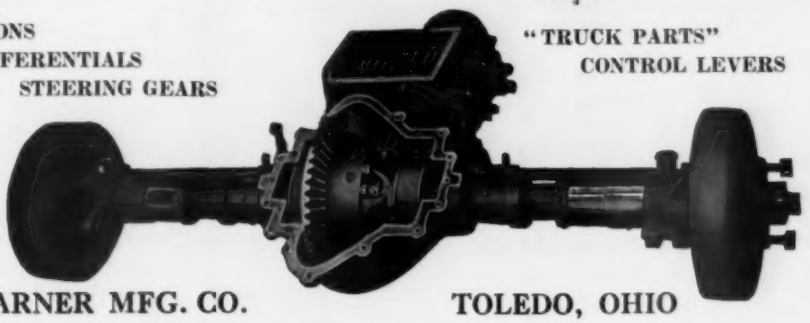
DIFFERENTIALS
STEERING GEARS

"TRUCK PARTS"
CONTROL LEVERS



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BIMEL SPOKE & AUTO WHEEL CO
Bimel
PORTLAND, IND.

Bimel Wheels of Quality

(OF OHIO AND INDIANA TIMBER)

BIMEL WHEELS OF QUALITY are made in a new and modern shop devoted exclusively to the manufacture of high-grade automobile and motor truck wheels. They are made by a company with a record of fifty years of successful manufacturing, and backed by exactly that many years of honest effort. Most people want the BEST; and also, most people find it pays to deal with responsible houses. Don't lose your grip!

Bimel Spoke & Auto Wheel Co.
PORTLAND, IND.

The Heart of 200 Commercial Car Catalogs on One Sheet

Table of Specifications of 1911 Gasoline Commercial Cars

Printed by the Publishers of
THE COMMERCIAL CAR JOURNAL
IS NOW READY

TELLS AT A GLANCE Type of Engine, Bore and Stroke, Ignition, Oiling, Cooling, Transmission, Drive, Axles, etc., as well as Brake and Clutch Lining Materials, Brake Area, Number, Size and Threads of Spark Plugs, Type of Rims, Size of Loading Platform, Height of Platform, Amount of Rear Overhang, etc., etc., enabling a RAPID COMPARISON OF ONE TRUCK WITH ANOTHER.

This invaluable table will be mailed to any address upon receipt of $1.00 (stamps accepted)

CHILTON COMPANY, Market and 49th Streets, Philadelphia

"The Atterbury"

Comprises the most skilled workmanship and best material,—every detail of their construction is worked out with the greatest care.

As pioneer manufacturers, we are able to supply any size or type for their purpose.

Write for our large and complete catalogue showing the various models from a delivery wagon to a five-ton truck.

Let us tell you more about this complete and satisfactory line of motor cars.

Atterbury Motor Car Company
Buffalo, New York

COVERT

COVERT TRANSMISSIONS and Jack Shafts for motor trucks form a unit. For this reason, this type of construction offers many advantages not found elsewhere.

Among some of the most prominent advantages is the ease with which the parts can be assembled—the absolute certainty of their being in proper alignment—and the absence of numerous complicated parts.

Lower costs of construction combined with greater simplicity and higher efficiency, are the features which place—not only the truck, but the truck builder—ahead of his competitor.

COVERT MOTOR VEHICLE COMPANY
LOCKPORT, NEW YORK

Red Head
TRADE MARK
SPARK PLUG

To make sure that big spark plug expense does not prevent you from winning the Commercial Car Journal's Economy Contest—be sure to use RED HEAD Spark Plugs.

It's the RED HEAD that provides maximum efficiency at the lowest safe limit of cost.

It's the RED HEAD that has the porcelain that "laughs at the heat."

It's the RED HEAD that is used by leading motor truck manufacturers as standard equipment.

And it's RED RIB Ignition Wire that carries the "juice" under all conditions.

RED HEAD—$1.00 for all sizes.
RED RIB—Primary 5c; Secondary, 12c. Magneto 10c, per foot. Rubber or Braided.

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BEST BRAKE LINING
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FOR PRICES AND FULL PARTICULARS
WRITE TO THE SOLE MANUFACTURERS

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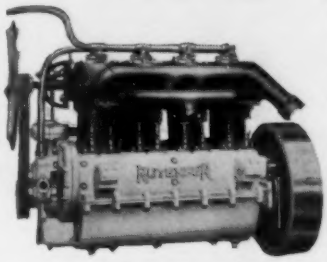
RUTENBER

The Motor That Always Makes Good



Manufacturers of Commercial Motor Vehicles find it to their advantage to feature the Rutenber Motor. It always makes good for them and for purchasers. It clinches the sales argument and convinces the prospective purchaser that he is getting the best.

The Rutenber Motor is found only in high class vehicles. Its matchless perfection in construction has established a reputation that is not approached by any other motor.

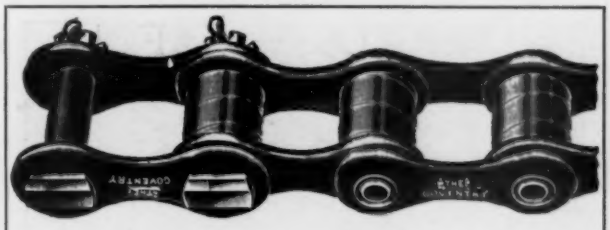
The Rutenber Motor is guaranteed for life.

Write for full particulars, specifications and terms.

WESTERN MOTOR CO.
Marion - - - - Indiana

"Reliable Springs are More Important on Commercial Cars than on Pleasure Cars."

THE PERFECTION SPRING CO.
Cleveland - - - - - - Ohio



You are doing yourself a great injustice if you do not try a pair of

"The Coventry"

Patent Roller Chains

on your commercial vehicle

They are made standard for all types and can be despatched upon receipt of wire or 'phone message. Their exclusive advantages can only be realized by actual experience—so order a pair to-day. The prices also are right.

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SOLE UNITED STATES REPRESENTATIVES

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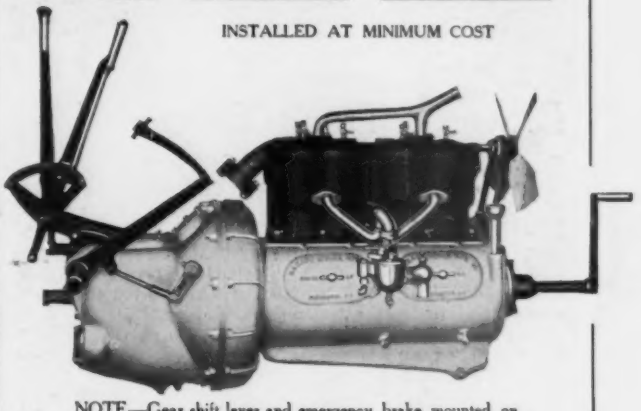
"HAZARD'S COMPLETE"

INTERCHANGEABLE
STRICTLY THREE-POINT SUPPORT

UNIT POWER PLANT
—FOR—
MOTOR BUSINESS VEHICLES

INSTALLED AT MINIMUM COST



NOTE—Gear shift lever and emergency brake mounted on transmission. Arranged for either right or left-hand drive.

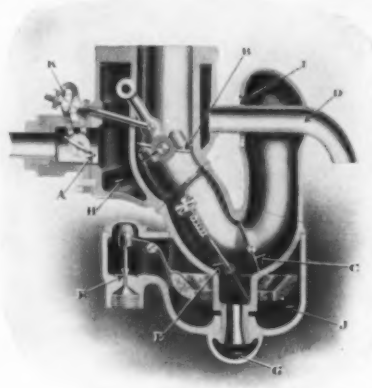
SALES ASSURED IF YOU ADOPT THE HAZARD

REASONS—Oil-tight and dirt-proof—simple—surprisingly powerful—compact—quiet—balanced—strong—"get-at-able."

HAZARD MOTOR MFG. CO.
89 SCHERER ST. :: ROCHESTER, N. Y.

MARVEL CARBURETER
THE NAME DEFINES IT

THE COMMERCIAL CAR CARBURETER



MOTOR TRUCK OWNERS!

Frequent stops are necessary—the motor should idle at very low speed—if it chokes up—if it does not move at once without being stalled—it means a great waste of fuel.

THE MARVEL CARBURETER enables the driver to slow down at each stop, thereby causing a decided saving in fuel.

Get a MARVEL for ECONOMY, FLEXIBILITY, POWER.

Fuel today is half gasoline, half kerosene,—but the MARVEL CARBURETER, with its large heating jacket **under automatic control,** will meet this contingency, and vaporization will be easy.

Special models for standard cars.

Shall we send booklet?

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WOLF'S HEAD OIL

"Best For Motor-Maker-Man"

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One way is to have it analyzed for its ability to resist high temperatures, and its freedom from both free and fixed carbon—and then compare the result with other oils.

The other way is to let us ship you a 5 or 10 gallon can and let your engine tell you.

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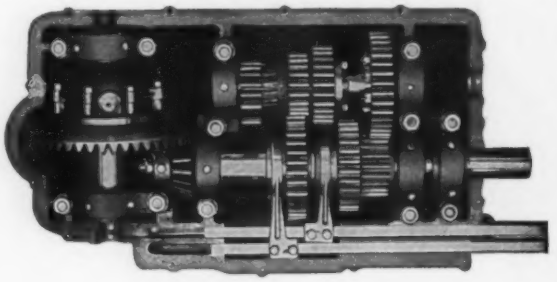


Type No. 750

Brownell Truck Transmission

This is not a Make-Shift Gear-Shift!

This transmission was designed for Commercial Cars, and will withstand the hard usage to which automobiles are subjected when employed in trucking service.

The gears are of SPECIAL OPEN HEARTH STEEL FORGINGS. There are eight TIMKEN ROLLER BEARINGS and AUBURN BALL BEARINGS inserted to take care of the thrust of the square shaft.

The weight of the transmission complete is 385 lbs., and its capacity is from five to six tons. The speeds are three forward and one reverse.

It is a SELECTIVE SLIDING GEAR, containing differential for double chain drive. We guarantee these transmissions for one year against defective material and workmanship.

REMEMBER—this is a specially designed and constructed transmission made for commercial cars, and is not a make-shift pleasure car gear shift.

Write for further particulars

F. A. Brownell Motor Company
Rochester, New York

TRUCKS

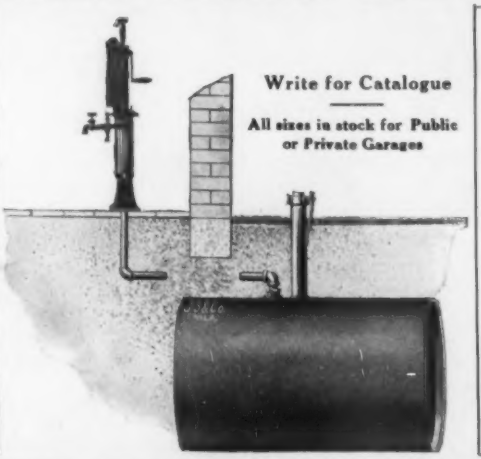
LEAKLESS—SAFE

ALL SIZES

Avoid Leaky Makeshift Tanks

GASOLINE STORAGE OUTFITS

FUEL SAFETY & ECONOMY



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All sizes in stock for Public or Private Garages

REDUCE FIRE RISK

JANNEY, STEINMETZ, Phila. & New York

$2000 Bergdoll TAXICAB

The First Taxicab on the Market selling at $2000.00 with the following equipment and high-class features:

Westinghouse Made Engine
Schwarz Artillery Wheels
Wm. & Harvey Rowland Co's Springs
Standard Roller Bearing Co's Axles
Warner Gear Company's Transmission
Bosch Magneto
R. I. V. Bearings
Continental Q. D. Demountable Rims and Tires

This is not a "GOOD ENOUGH" Taxicab but one with quality unexcelled by any cab built, NO MATTER WHAT THE COST MAY BE. ¶ We know the minimum cost of each cab and the maximum service obtained, because there is a Taxicab Company in Philadelphia operating one hundred cabs daily and each averaging fifteen thousand miles yearly, and a number of companies in other cities are receiving the same results.

We shall be pleased to send you descriptive matter upon request.

LOUIS J. BERGDOLL MOTOR COMPANY, Department "S" **Philadelphia, Pa.**

POLACK MOTOR TRUCK TYRES

are absolutely guaranteed for

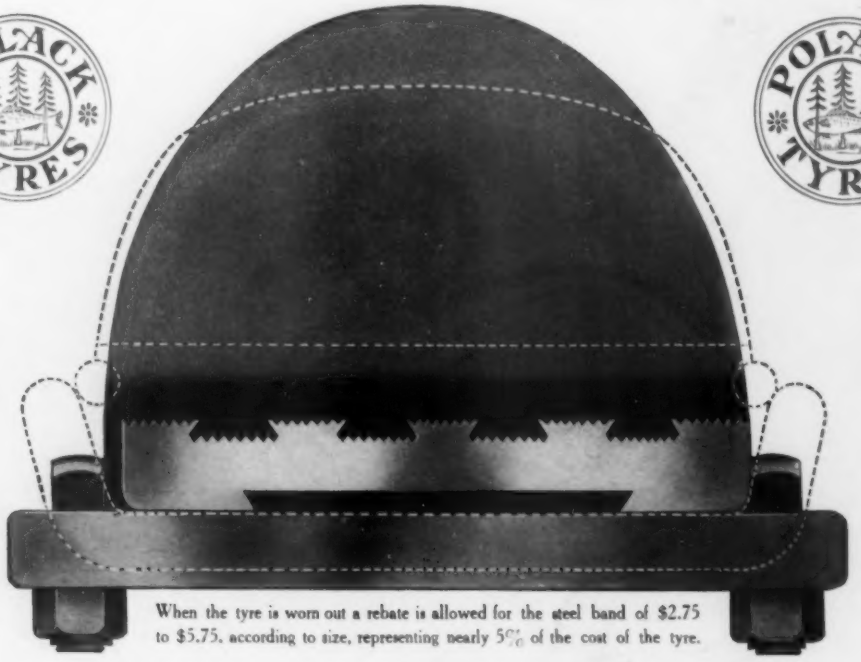
8,000 MILES' SERVICE

They are not to be compared with ordinary truck tyres either in size or price. In first cost they are about 20% higher. In cost per mile they are 50% less than other tyres.

POLACK TYRES are the WORLD'S STANDARD

and provide a greater wearing volume than any American tyres made, as shown in the following table:

		Total volume of rubber above rim of side-wire tyre and above hard rubber of Polack Tyre	Additional wear provided in Polack Tyres
Side-wire	36 x 3	315¼ cubic inches	
POLACK	36 x 3	425¼ " "	34.9%
Side-wire	36 x 3½	412½ cubic inches	
POLACK	36 x 3½	523½ " "	27%
Side-wire	36 x 4	413½ cubic inches	
POLACK	36 x 4	685¾ " "	65.8%
Side-wire	36 x 5	605½ cubic inches	
POLACK	36 x 5	825 " "	36.4%
Side-wire	36 x 6	708 cubic inches	
POLACK	36 x 5½	1032½ " "	45.8%
Side-wire	36 x 7	927 cubic inches	
POLACK	36 x 6½	1602½ " "	72.8%



When the tyre is worn out a rebate is allowed for the steel band of $2.75 to $5.75, according to size, representing nearly 5% of the cost of the tyre.

POLACK TYRE COMPANY

1741 Broadway, New York

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